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Horoscope for 1961

THIS is traditionally the season for crystal gazing, when statesmen and economists, specialists in market research, leaders of commerce and industry, investment consultants, and other informed observers of the contemporary scene are accustomed to don the mantle of foresight, however gingerly, and make authoritative pronouncements, however nebulous, as to what the next twelve months may have in store.

Over the all-too sanguine predictions which heralded the advent of what is now last year, kindness demands that the curtain of oblivion remains discreetly drawn. Having been so wide of the mark in their forecasts for 1960, some of the more optimistic seers have become understandably reluctant to risk burning their fingers by anticipating events too precisely. Moreover, the crystal bowl is too thickly clouded with political and economic uncertainties to be easily read.

The new year has been greeted by the cooing of the Kremlin doves and the beating of war drums in Laos; by brightening prospects for successful disarmament negotiations and by a further deterioration of the unhappy situation in the Belgian Congo. Prospects for peaceful co-existence, on however mistrustful a basis, appear to have been improved by the defeat of the "fundamentalists" at the conclave of world Communism held recently in Moscow; nevertheless there can be no assurance that the embers of the cold war will not be fanned into flames while there remain potential flash points such as Laos, Cuba and the Belgian Congo, with their highly explosive elements. Nor is the task of the political prophet made easier by such unpredictable factors in the 1961 equation as the outcome of the three separate conferences on the future of the two Rhodesias and the Central African Federation, or the political and social consequences arising from the setting up of a republic in the Union of South Africa.

Among the predominant factors shaping the political and economic destinies of the Free World in 1961 will be the impact of America's young President-elect and his Administration, from whom a fresh and constructive approach to both international and domestic problems is expected.

One of Mr. Kennedy's most urgent tasks is to bring a new sense of purpose and destiny to the United States itself, as well as to lift the national economy out of the mild depression into which it has been gently sliding. It remains to be seen whether the latter objective can be accomplished without further loss of confidence in the dollar, the value of which Mr. Kennedy is pledged to preserve. Meanwhile, the majority of the economic indicators are holding up well and the immediate outook has become rather more encouraging. The consensus of informed opinion now is that by the second half of the year, at latest, business activity will have resumed its upward trend, aided by whatever anti-recessionary measures the new President may decide to adopt.

The problem of stemming the heavy outflow of gold from the U.S. Treasury may prove rather more intractable, since confidence in the dollar cannot be re-established overnight. Having regard to the recuperative powers inherent in the American economy, it may be that 1961 will fail to bring the long-awaited increase in the dollar price of gold. However, the possibility of a rise in the gold price, whether by unilateral devaluation of the dollar or by international agreement, can scarcely be excluded at the present stage and interest in both bullion and gold shares can be expected to remain at a high level throughout the current year.

Not the least far-reaching consequence of the pressure on the American dollar may be attempts, under the initiative of Mr. Kennedy, to achieve a closer dovetailing of the different national economies within the Western World, the objective being a common policy designed to encourage trade expansion and step up the flow of financial and technical assistance to those areas of the world which depend primarily on exporting raw materials and where poverty is still widespread. Of great interest in the latter connection is the project currently under examination by the British Government for creating a department which would bring together all forms of British technical and advisory assistance for overseas territories (see *The Mining Journal*, December 30, 1960, p. 732).

In Western Europe, more especially in the Common Market countries, economic activity is expected to remain at a high level throughout the year and further, though smaller, rises in industrial production may be achieved. In the United Kingdom, however, where the demand for many consumer goods has fallen and the economy is now sustained by a boom in the capital goods industries, the payments position still ranks as the most urgent problem. Prospects for the expansion of our exports are at present rather bleak, but sooner or later the effects of the credit squeeze must surely be reflected in a falling import bill. Once the gap begins to narrow, the Government's prime objective will doubtless be the revival of consumer demand before the capital boom turns down. An upturn in the United States economy would, of course, provide world trade with a timely shot in the arm, so producing more favourable conditions for exports.

While the short-term outlook for a few metals, notably lead and zinc, has been affected by the setback in the motor car industry, consumption of most metals and minerals outside the United States is expected to remain at a high level and in some instances might well exceed last year's record figures. Indeed, any significant recovery in United States demand could well result in a shortage of certain metals, notably tin. As we reported last week, Mr. Henry S. Wingate, chairman of International Nickel, predicts that, despite the slowness in pickup in the United States, Free World consumption of nickel will again be at a very high level in 1961. However, with the Thompson project on the point of starting production, no shortage of nickel is anticipated, despite the loss to the Free World of the projected Cuban supply.

Mr. Robert C. Page, president of Phelps Dodge Corporation, doubts whether U.S. domestic consumption of copper in 1961 will be much in excess of that for the past year, but he expects consumption in Europe to continue at a reasonably high rate. The outlook for 1961 is clouded with many uncertainties for the producers of copper, comments Mr. Page, but the year could be a satisfactory one. These uncertainties include the threatened strike at El Teniente in Chile, now virtually certain to materialize, and the possibility that civil war might break out in the Congo and jeopardize the operation of the Katanga mines.

Industrial diamond production has recently been resumed in the Belgian Congo after being brought to a standstill in late August, when M. Lumumba's army invaded the Kasai. Forminière has announced a target of 12,000,000 carats for 1961, which compares with an output of 14,400,000 carats in 1959, the last full year of normal production. In view of the unsettled conditions currently prevailing in the Kasai, it seems possible that this target may prove over-ambitious for the present year.

In contrast to the enthusiastic reception accorded to 1960, aluminium producers in the United States are approaching its successor in a mood which has been described as one of " tempered optimism ". Inventory reduction by aluminium users is now nearing completion, reports Mr. Richard S. Reynolds, Jr., president of Reynolds Metal. As a result, shipments during 1961 should be above those of 1960, which declined by about 5 per cent from the 1959 total of 2,479,500 tons. " In 1961 ", adds Mr. Reynolds, " total economic activity is expected to gain strength at mid-year. This should be accompanied by a sharp rise in the aluminium industry which traditionally rebounds faster than the rest of the economy ". Outside the United States new gains in aluminium consumption can be expected, but conditions in the industry are becoming increasingly competitive.

The first adjustment of national tariff rates to a common level within the European Economic Community was scheduled to come into effect on January 1. As pointed out in our issue of December 9, this development will have an important impact on the metal industry, because EEC's common tariff scale provides for a series of import duties on metals to replace those previously imposed by some individual Common Market countries. In member countries where existing duties on some commodities are lower than those provided by the new scale, a quota system will permit limited imports either free of duty or at favoured rates. It is hoped that by this means the traditional trade relations in the metal industry will be maintained.

The move towards an external tariff will add to the difficulties of British exporters. However, the possibility of bridging the gap between the Six and the Seven and associating the United Kingdom with the Common Market seems gradually to be becoming rather less remote.

Competition between Russia and America in space exploration should bring further gains to the " moon metals " —columbium, tungsten, beryllium and others. In view of recent achievements, it seems by no means an improbability that before the end of 1961 man will have made his first journey into space and survived to tell the tale.

NON-FERROUS METALS TRENDS IN 1960

The O.E.E.C. Non-Ferrous Metals Committee has published a report containing statistics for 1959 and trends for 1960.

The main body of the report brings up to date the statistical information on production, consumption, imports and exports and metal uses at the first processing stage, as collected by the Committee. A statistical series for aluminium end-uses is included with figures for 1958 and 1959; this means that for the first time the flow of processed aluminium to the various consumer industries has been put on a comparable basis for European countries.

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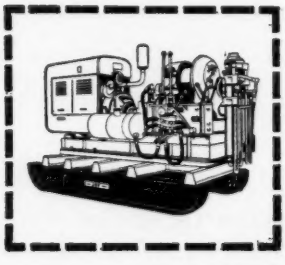

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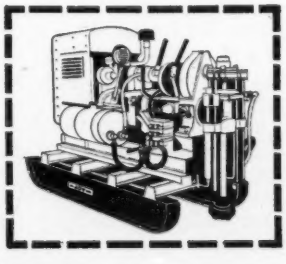

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The topical interest of the publication is enhanced by a brief survey of market developments in 1960 made by the Committee at the end of October, which also includes short-term forecasts on the activity of European non-ferrous metals industries.

The year 1960 was a record one for European non-ferrous metals production and consumption as well as for imports. The upward trend of activity continued unabated for the first nine months but the Committee felt that it might weaken somewhat towards the end of the year and early 1961, mainly due to the limited amount of capacity and particularly manpower available, but also to credit restrictions in some countries designed to ease the pressure of demand before it leads to inflation.

Progress in processing industries, particularly for aluminium and copper, has been quite spectacular and the production of aluminium and copper semis and castings is reported in some countries to be 25-30 per cent up on the first half of 1959. Although some new capacity has come with service, deliveries are still abnormally slow in some cases. In the zinc processing industry, the greatest expansion was made in die-castings and brass products. According to the experts, zinc and aluminium die-castings are now meeting with more and more competition from plastics, e.g. for motor vehicle accessories. Demand for lead products remained stable but demand for nickel steel and anodes was stimulated by the insistence on better finishing for consumer durable goods and the export market.

The second part of the report describes the expansion of European non-ferrous metals industries in the nineteen-fifties. The progress made by producer and consumer industries and the changes that took place during this period in the pattern of European consumption and trade are set forth in this analysis, which is based on the statistics collected during the last ten years and related to the general economic background during this period.

The non-ferrous metals industry in the O.E.E.C. countries has been in continual expansion since 1950, to a much more marked degree than any other areas in the Western world. Both production and consumption rose by over 50 per cent and net imports more than doubled, thus increasing considerably the overall dependence of the area on raw materials supplied from outside. Whereas the O.E.E.C. area has maintained its proportion of output in the Western world at slightly more than one-quarter, its relative importance as consumer increased and is now approaching that of the United States.

NATURAL GAS IN EUROPE

The O.E.E.C. Gas Committee has published its 1960 report entitled "Gas in Europe". While overall energy requirements of the O.E.E.C. countries have been expanding by about 4 per cent per annum during the past ten years, demand for gas has been rising on average by about 6 per cent per annum. Between now and 1965 the Gas Committee expects the annual increase in gas requirements in the O.E.E.C. area to average 4.5 to 5.5 per cent, though the rate will probably vary from one area to another. Where natural gas is available, demand is likely to grow much more rapidly, especially if transport networks are provided to bring the gas to places far from the production areas.

There is still some uncertainty about the amount of natural gas that will be available in Europe in 1965, and even greater uncertainty about the more distant future. A newcomer to the gas family, natural gas has made a major contribution to gas supplies in Italy and Austria for some years now, and has become increasingly important on the French market since the discovery of the South-west deposits. Prospecting is going ahead in Germany and the Netherlands. In 1954, the O.E.E.C. area produced approximately 4,000,000,000 cu.m. of natural gas (at 9,000 kcal/cu.m.); output is expected to reach 11,000,000,000 cu.m. during 1960 and could be 16,000,000,000 or 20,000,000,000 cu.m. by 1965. In calorific value, therefore, output by 1965 should be equal to more than half the expected production of manufactured gas. These figures, of course, refer only to the home production of member countries, excluding imports from overseas.

As for natural gas from the Sahara, it should be technically possible, given the volume of present proved reserves, to reach a yearly output of 20,000,000,000 cu.m. at 9,000 kcal, of which 15,000,000,000 cu.m. per year would be available for export to Europe.

In a special chapter the Gas Committee sums up the technical aspects of transporting natural gas from the Sahara and other areas outside Europe. In actual mileage, the Saharan deposits are nearer to the industrial centres of Europe than are the Texan deposits to New York or Chicago, but the real difficulty is crossing the Mediterranean. Two methods are described; the methane tanker in which the gas is carried in liquid form at minus 160 deg. C., and transport by underwater pipeline. Shipments in the "Methane Pioneer" have proved that the first method is technically feasible. As for the second, present knowledge suggests that in view of the large quantities it could handle, transport by pipeline might well prove less costly than transport by sea.

Another important issue is the kind of gas to be used in areas which can be supplied with natural gas. Should the raw gas be used, or should it be reformed to give it the characteristics of manufactured gas? Following a study made by a group of experts to determine the respective advantages and disadvantages of the two methods, the Committee concludes that there is a general and increasing tendency to supply natural gas in crude form where supplies are secure and available on a sufficiently large scale at favourable rates.

Taking imports from abroad into account, the prospects for natural gas appear to be exceptionally good, and it seems likely to play an important part in Europe's future gas supply. But it must not be expected that natural gas will revolutionize the energy balance sheet of O.E.E.C. countries, since it will account for only a relatively small percentage of total consumption of energy.

GREEK MINERAL DEVELOPMENTS

Gold reserves have been discovered east of Servia in the northern Greek province of Kozani. The reserves are formed by a 10-km. long deposit, in which 2 gm. of gold are contained in every cu m. of sand. Preliminary work has already begun on the exploitation of the deposit, which is superior to that in the Gallikos River area north of Thessaloniki.

Mr. Martis, Greece's Minister for Industry, stated recently that chrome ore exploitation in the same Kozani province had had positive results, and the deposits were now considered extensive enough to ensure steady feeding of a smelting works. In other fields, a Greek company was considering the erection of a zinc plant in Greece, while the search for magnesite and iron ore was being intensified. Iron ore exploration on Crete and Thasos had shown that the Thasos reserves were second only to those at Seriphos, as far as Greece was concerned. Also, the Greek non-ferrous metals industry was now studying the possibilities of exploiting newly-discovered reserves of indigenous copper, molybdenum, antimony and gold.

MINING IN CANADA – ITS PROGRESS AND PROSPECTS

Despite setbacks, the growth of Canada's mining industry continues, and it seems certain that new production records were reached in 1960. The industry's progress, prospects and problems are comprehensively reviewed in the Annual Review Number of "The Northern Miner", from which this survey is extracted

ALTHOUGH 1960 has not been such a profitable year for the Canadian mining industry as was predicted in many forecasts made a year ago, it seems certain that new production records have been achieved. There have been increases in the volume output of asbestos, coal, copper, gold, lead, natural gas, nickel, petroleum, silver, zinc and salt. Since most prices have not changed materially during the year, the value of production in 1960 will possibly reach an all-time high.

Fifteen Years of Expansion

Looking back over the 15 post-war years, the Hon. Paul Comtois, Minister of Mines and Technical Surveys, reviews the amazing expansion of the industry and comments on future possibilities. Responding to the demands of a rapidly expanding domestic economy, writes the Minister, and to the impact of various international developments, the mineral industry continued to expand. In 1959, its output (including petroleum and natural gas) was valued at $2,400,000,000—almost five times that of 1946 as measured in current dollars.

An interesting change took place in the past five years when crude oil and uranium became the leading contributors to the mineral output and iron ore assumed a place of major importance. Diversion of production has long been an important characteristic of Canada's mineral economy and this has been greatly extended by the large quantity production of these three minerals. Numerous other mineral discoveries have been made since the war and these have helped to broaden the geographical and commodity base of the industry. These two factors, coupled with Canada's overall mineral resource potential, provide a solid foundation for expansion in the years ahead.

As a consequence of this growth and diversification, the index of physical volume of production has increased by more than 200 per cent since 1946 compared with a 50 per cent increase in the output of all manufacturing industries. Although the gross national product has shown an average annual increase of 4½ per cent since the war, the value of mineral production has increased at almost double this rate. In terms of net value added during production, the mineral industry has registered practically a five-fold increase, compared to rather less than a two-fold increase for all other primary industries.

The production of gold and coal declined over the period 1946-59, gold in the face of rising costs and a fixed selling price and coal as a result of increasing competition from oil and natural gas. These, along with the more recent marketing problems in the uranium industry, are difficult areas in a picture that is mainly bright otherwise. They are matters in which close co-operation between industry and government is required. The recent extension of the Emergency Gold Mining Assistance Act until 1963 will be of material benefit to the gold industry in this difficult period.

Quite apart from statistical indications of new records, there is much evidence throughout the industry of continuing growth and diversification in the mineral economy. Important mine and plant developments are taking place throughout the country. Although the mineral export market remains of paramount importance to the industry, and to the Canadian economy at large, it is encouraging to note the progressive increase in demand for iron ore, copper, lead, fuels and industrial minerals in the domestic market. This trend will enable the industry to cope more adequately with any adverse changes in international trade that may develop from time to time.

Future Outlook

As regards the future, the Minister considers that, although international events of the next 15 years may pose major problems for the Canadian mineral industry, they need not seriously affect the outlook, provided the industry gives ever-increasing attention to efficiency at all stages from exploration to marketing. There is great scope for research that would lead to the development of new markets and the provision of suitable materials to meet the needs of the space age.

One of the benefits of an increasingly effiecient and more competitive industry, it is pointed out, will be an advance in the degree of mineral processing in Canada. There is much scope for improvement from the present situation in which semi-fabricated or finished forms constitute only about one-tenth of the value of Canada's nonferrous mineral exports and one-fifth of the nation's total requirements of rolled steel products are imported.

Having regard to the great potential market resulting from the growth of world mineral demand, and to the postwar record of the Canadian mineral industry relative to growth and adaptability, the Minister predicts that the nation's mineral production in 1975 will be at least twice as great as that of 1960. The extent to which this 1975 estimate is exceeded will depend in large part on the determination with which industrial research is maintained.

Possibly one of the greatest decisions facing the country is the direction which the Canadian economy should take in the years immediately ahead. On the one hand there is a desire for more growth in the manufacturing sector, which might lead to pressure for increased protection, though action in this direction could conceivably increase the costs of the primary and processing industries and make Canadian primary and processed products less competitive abroad. On the other hand, there is a desire for increased incentives for exploration and development of primary resources in which Canada has a comparative advantage in the export market, possibly at the expense of continued growth in the domestic manufacturing sector. In the final analysis, concludes the Minister, maximum economic growth at all stages from mine production to final processing will come about as a result of the best possible co-ordination of supply, demand and cost factors.

Expanding Mineral Exports

Canadian exports of primary and semi-processed metals and minerals showed a substantial increase in 1959 over the previous year, reports the Hon. George Hees, Minister of Trade and Commerce. The upward trend continued in 1960, as indicated by a rise in the value of exports and their products for the first eight months of 1960 to $1,118,694 as compared with $942,357 for the corresponding period of 1959.

Since metals and minerals account for one-third of Canada's exports, every effort is being made by the Department of Trade and Commerce and the industry itself to maintain the foreign demand and to create a better understanding abroad of Canada as a desirable source of supply. In this connection, the Minister referred to a recent trade mission organized by the Department of Trade and Commerce, which visited the E.E.C. countries in October, 1960. Mining was prominently represented in this mission, the results of which are expected to have lasting value.

Growing Competition in Export Markets

Canadian miners, with most of their products sold abroad, face competition of particular intensity from other mining countries, most of them with the advantage of lower costs. Mr. V. C. Wansbrough, vice-president and managing director of the Canadian Metal Mining Association, summarizes the most pressing problems and discusses some of the measures that will be necessary if Canadian mines are to survive this competition.

Of an annual production of metals and minerals now running at the value of about $1,400,000,000, all but quite a small proportion must be sold abroad. But Mr. Wansbrough points out that over-production is not peculiar to Canada. Indeed, many of the so-called underdeveloped countries of South America, Africa, the Indian continent and the Far East, as well as the Soviet Empire, are very much on the move in the development of their own resources, spurred on by the strong wave of nationalist sentiment which is so marked a feature of the current world scene. The full and perhaps furious impact of this world-wide competition has yet to make itself felt.

First and foremost, Canadian mineral producers are feeling the effect of the new conditions in their largest and closest market, the United States. The dependence of the United States on imports of many major metals—nickel, lead and zinc, iron ore, asbestos, and to some extent copper—is not disputed. Yet imports of these metals and minerals into the United States are constantly meeting stiffer resistance as segments of the domestic mineral industry are quite understandably determined to obtain the utmost value from their domestic deposits. Canadian producers must be prepared for a succession of attempts to stiffen the barriers against imports into the United States.

With this prospect ahead, it is clearly common sense to seek alternative markets. This, however, is easier said than done. Canadian producers are immediately faced with two strong competitive factors; supplies of metals and minerals flowing into the markets of the West from other Free World countries at a time of almost universal oversupply; and, secondly, mineral exports from behind the Iron Curtain, which, being the products of state-controlled economies, are not subject to the usual factors that determine price levels in the free economies.

As regards mineral products from other Free World countries, Mr. Wansbrough considers that Canadian producers can and must compete, given reasonably fair and equal terms of competition. But in some respects the dice are loaded against them, particularly in high labour costs and in the continuing premium on the Canadian dollar. While it is neither desirable nor feasible for Canada to reduce its wage rates and thereby depress its standards of living, the writer emphasizes that, if additional wage increases are pressed for without proportionate increases in productivity, Canadian producers will find themselves even more marooned on a high-cost plateau, having cut their lines of communication with the markets of the world.

The premium on the Canadian dollar is admitted to be a tough problem, but it is emphasized that the consequences of the continuing premium are also tough. The dollar premium imposes in effect a tax of 3-4 per cent on everything Canada sells abroad; it offers a 3-4 per cent discount in favour of U.S. products competing inside Canada with the corresponding products of Canadian manufacture. The view is expressed that one of the readiest ways of helping Canada's export industries, at the same time as the hard-pressed Canadian manufacturers, and of giving a healthy stimulus to the national economy, would be to devise ways and means of eliminating this crippling handicap.

Uranium's Future Markets

The prospects for Canadian uranium after the existing government contracts expire are discussed by Mr. A. F. Lowell, Head, Marketing Department, The Rio Tinto Mining Co. of Canada, who points out that the initial loading of Canada's first full-scale nuclear power station, the CANDU, will reportedly amount to about 100 tons of uranium oxide in concentrate, and the annual replacement charge will amount to about 25 tons. Mr. Lowell states that a single typical mill in the Elliott Lake area of Ontario could produce the 100 tons of oxide needed for the initial loading in about a month. It is obvious that many nuclear power stations are going to be needed throughout the world in order to maintain a viable uranium industry after the existing government contracts expire. The present consensus of opinion is that supply from a much reduced mining nucleus will not begin to move into balance with demand much before the end of the present decade.

Under present conditions of oversupply, competition for even small orders is intense and the "open market" price for uranium has already fallen considerably below the price at which the bulk of uranium is sold under government contracts. Atomic Energy of Canada Ltd. is now using a price of $6 per lb. of U_3O_8 in concentrate for economic study purposes. Some sales for export have been made at "ridiculously low prices" in relation to the quantities involved. In fact, there is a danger that some of these very low prices, if used by nuclear power plant designers for economic study purposes, will cause erroneous estimates to be made on the actual long-term costs of nuclear power.

Not least of the frustrations besetting sellers of Canadian uranium, states the article, is the continued existence of antiquated controls on the sale of natural uranium to other countries. Present controls on the sale of natural uranium, it is pointed out, cannot of themselves prevent the spread of nuclear weapons.

Apart from difficulties caused by present oversupply, disorderly prices and excessive government regulation, the seller of uranium mill concentrate must ask himself whether he has the right product to market over the longer term. This section of Mr. Lowell's paper was summarized in our issue of December 16, 1960, page 690.

In a sense, concluded the article, the very large uranium mining industry which has been developed throughout the world came into existence under special military pressures about a decade too soon. As a result, under present conditions of oversupply, it has lost much of its original glamour. Nevertheless, there is little doubt among producers that the industry will have to grow to even larger stature in future years. Those producers with a long-term stake in the business are prepared to meet and overcome all present difficulties.

The Airborne Scintillation Spectrometer

By *A. Hatton B.Sc., F.G.S.*

Senior Geologist, Hunting Technical Services Ltd.

THE climate of mineral exploration generally has changed and interest in uranium prospecting in particular has lessened considerably since the rather frenzied period of the immediate post-war years.

As far as the large so called nuclear powers are concerned, there is likely to be over production of nuclear raw materials during the next decade. It is probable, therefore, that the days of mono-mineralic uranium prospecting are over for the present, but there are indications that uranium search will continue to be incorporated in more general prospecting programmes. In the immediate future the emphasis will be on the economics of such exploration and these will be effected in part perhaps by the introduction of new techniques, but mostly by rendering the present methods more effective.

Airborne geophysical methods will continue to play a part in preliminary investigations in general and the scintillation counter in radioactive search in particular.

It is now more or less common knowledge that scintillation counters are able to detect gamma emitters of the thorium, uranium and potassium K_{40} series in outcrop or sub-outcrop. In the past expensive ground follow up has often been necessary to differentiate between these sources.

The scintillation counter has been used extensively as an assay tool on the ground and much thought has been given to the possibility of extending the process of discrimination to airborne equipment. If the method can be satisfactorily applied, then anomalies can be classed as mainly U, Th or K_{40}. Interpretation would consequently be much more positive and the amount of ground follow up could be reduced, thus making the whole prospecting programme more economic.

Doubts have been expressed about the feasibility of the airborne spectrometry and in order to form a reasoned opinion about the method, certain basic principles must be understood.

Some substances, such as anthracene, naphthalene, alkali halides (thallium activated), scintillate when subjected to charged particles or gamma rays. A photomultiplier tube converts these scintillations to electric pulses and amplifies them. In any ordinary scintillation counter the total number of pulses is counted regardless of energy.

In a discriminating system the pulses are counted according to their size, the assumption being made that this is proportional to the energy of the gamma ray.

The reaction of a gamma ray with the matter making up the crystal must be considered. This interaction takes place in three ways by (a) Compton effect—here photons impart energy to loosely bound electrons; the amount of energy transferred depends on the angle of collision; (b) photo-electric effect — photo-electrons are expelled from the outer shells of atoms and these have an energy *equivalent to the original energy of the gamma ray minus the shell binding energy;* (c) pair production—a definite energy is needed to produce the pair and their combined energy will be original gamma energy minus this amount.

In the case of lower energy rays, the method of interaction is largely a combination of photo-electric and Compton effects and the result is a discontinuous line spectrum of pulses superimposed on a continuous spectrum resulting from gamma rays which have lost varying amounts of energy by Compton scattering.

It has been proved that if survey heights are kept below about 50 m., the ratio of direct to scattered gamma rays is reasonably high. Experimental work in the United States by F. J. Davis and others has proved that in fact the energy distribution is effectively constant from the ground up to about 1,000 ft.

Although there is a large amount of scattering in the air between the counter and the source in airborne work, a sufficient proportion of primary radiation to scattered radiation can be expected to reach the crystal at fairly low altitudes.

For several years workers, while accepting the theoretical difficulties, have been working empirically. There have been two basic methods of approach, viz.

(a) An integral method in which a lower threshold is set to the energy of pulses counted in each channel. The gate is moved up so as progressively to exclude photo-peaks considered of significance.

(b) A differential method in which an upper as well as a lower limit is set to the energy of pulses recorded in each channel.

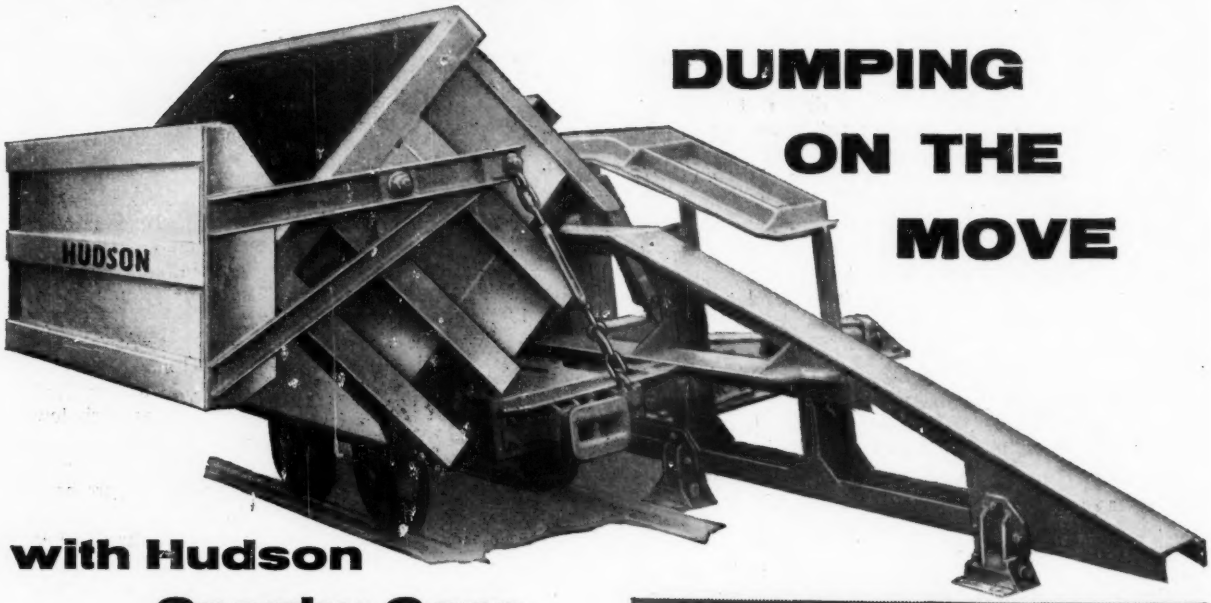
Earlier workers used comparatively small crystals and somewhat unstable electronic systems and produced some results which were often difficult to interpret satisfactorily.

The question arises as to which photo-electric peaks should be utilized in this analysis. There are several possibilities and the best combination will probably only be determined empirically, but theoretically at least certain photo-peaks appear to be most promising.

Thorium Channel

There are no significant uranium photo-peaks above 2.30 Mev, but there is a distinct thorium series peak at 2.62 Mev ($Tha.^{208}$), so that a gate set with its lower limit at say 2.30 Mev would theoretically be best for picking out thorium sources. (In fact with normal sized crystals very few pulses could be expected above this level and counting them poses problems in a comparatively fast moving areoplane.) Other authorities consider that the thorium photo-peak at 0.930 Mev where a greater number of counts can be expected than at higher energy levels is sufficiently prominent to be utilized; the Commissariat à l'Energie Atomique workers, in their second discriminator developed in the period 1958/59 initially at least set the thresholds of their thorium channel at 0.700 Mev and 1.05 Mev. There is, however, a small almost coincident uranium photo-peak as well as another at 0.77 Mev which might be expected to interfere somewhat with interpretation, as would Compton scattered gammas for higher uranium energies.

FULLY AUTOMATIC



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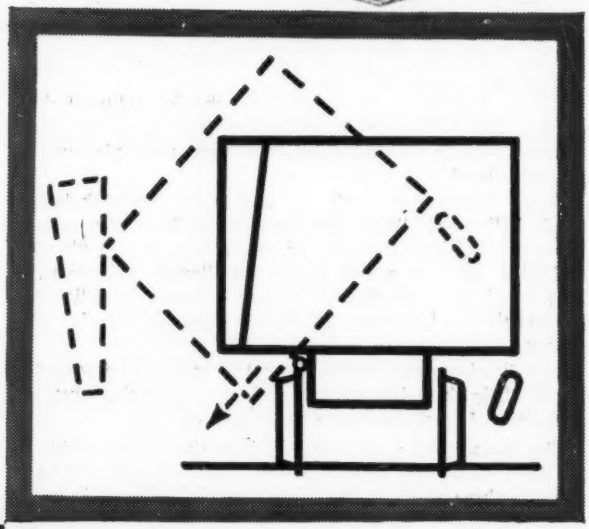

Schematic drawing showing single side discharge 'Granby' Car operating over a ramp at the side of the track. Maximum angle of tip is 50°.

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Uranium Channel

The small, but well marked, uranium series photo-peak at 1.76 Mev (Bi^{212}) appears to be a useful reference level. There is a thorium peak at 1.61 Mev, however, so that perhaps the ideal lower threshold would be about 1.70 Mev and the upper level at about 2.00 Mev if a differential system is used.

Potassium Channel

Potassium is mono-energetic; the photo-peak at 1.48 Mev is very well developed and a channel counting pulses of energy between say 1.40 and 1.55 Mev would probably be most satisfactory.

Members of the Commissariat à l'Energie Atomique during the course of most energetic and successful uranium prospecting programmes, both in Metropolitan France and in Africa, reported at Geneva in 1958 their work using an integral system utilizing a 4 channel recorder. The first channel recorded all pulses above 35 Mev; the second all above 1.3 Mev; the third all above 1.46 Mev and the fourth all above 2.1 Mev.

Over a granite source in which the main gamma emitter is K_{40} an anomaly would be indicated on channels 1 and 2, but on the 3rd and 4th channel, pulses with energies below 1.48 Mev would not be counted. Over a uranium source anomalies would be shown on the first three channels and over a thorium source all four channels theoretically should show an anomaly. In fact, the count rate on channel 4 with even a large crystal is very small indeed and great difficulty is encountered in recording these counts. In an area of mixed sources anomalies would also be recorded on all channels and in such cases positive interpretation would not be possible.

It now appears likely that the rather more refined differential system of discrimination offers a greater chance of producing useable and reliable results. This system uses say 4 channels with 1 channel recording total count; the other 3 having an upper as well as a lower threshold (i.e. events would be recorded from three comparatively narrow bands). This system gives better discrimination but presents even great problems in data presentation, since count rates are lower than in the integral method.

Difficulties of instrumentation consequent on this scheme are mainly concerned with instrument stability and the utilization of a counting system, which would give a satisfactory record in each channel without the necessity of having to use an electronic time constant so long as to ensure that many small sources would not be picked up at all. The stability problem can perhaps be overcome by extremely careful circuit design and temperature control and the counting problem will be simplified by the use of a very large thick crystal. Some workers (Pringle Nuclear Enterprises/Lundberg), have used a recording system where each count is shown as a mark on the flight record. Such a system must have a very small dead time. Photographic recorders are eminently suitable for recording several records on the same paper.

The design of an effective system will be expensive (e.g. size of the sodium iodide crystal will probably need to be of the order of 7-8 in. dia. and 6 in. thick).

Flying heights need to be low (50 m. maximum) and time constants as long as possible so that fairly low ground speeds will be necessary to lessen the possibility of missing small but significant sources altogether.

It is considered probable, therefore, that although expensive and technically difficult, a fully effective airborne discriminator can be designed.

So far as the writer is aware, no results of successful airborne discrimination have yet been published and it is considered probable that the difficulties have not yet been fully resolved. It remains to be seen, therefore, if the more positive interpretation and consequent saving in ground follow up will justify the increased costs of surveys utilizing an airborne scintillation spectrometer.

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FUTURE OF THE KOLAR GOLD MINES

The future of the Kolar gold mines in India is now under active consideration by the Government of India and the Mysore Government. Since their nationalization in 1956, these mines have been managed by the Government of Mysore. Two alternatives are now said to be under consideration, either to form a corporation for the management of the mines, or to hand over their working to the Government of India. It is stated that the Mysore Government has no objection to handing over the mines to the Government of India. In this case, Mysore would have to receive royalties on gold and silver, as in the days before nationalization.

Three mines are currently in operation, namely, Mysore, Champion Reef and Nundydroog.

Investment in the three undertakings totals Rs. 18,029,000. During the year ended March, 1960, a total of 587,293 tons of ore were milled. Gold production during the year 1959-60 was 4,772,587 gms. The proceeds from the sale of gold amounted to Rs. 51,136,000.

Europe as a Market for Commonwealth Minerals

FOR the purpose of the survey, steel has been taken as the key to the consumption of other metals and its consumption related to the gross national product (GNP) from 1950/55. In those years, due to special circumstances causing a high demand for steel, there was, in Europe, a 2.1 per cent increase in apparent crude steel production for every 1 per cent increase in GNP. Forecasts for future production vary from a "high" of GNP 1 : 1.52 for 1954/62 by the U.K. Iron and Steel Board, to a "low" of GNP 1 : 1.2 for the next 20 years by ECSC, with the ratio finally adopted by the authors as GNP 1 : 1.38 as the most probable and GNP 1 : 1.57 as the top limit. These ratios applied to GNP forecasts give an increase in domestic European consumption from 67,000,000 tonnes in 1955 to 120,000,000-130,000,000 tonnes in 1970.

During the five-year base period 1950/55 the following GNP ratios applied to other metals: refined copper consumption 1 : 1.8, refined zinc 1 : 1.13, refined lead 1 : 1.25, refined tin 1 : 0.63, primary aluminium 1 : 3.7. For the years 1955/70, the following European relationships have been established: copper GNP 1 : 0.99-1.49, lead GNP 1 : 0.52-0.69, zinc GNP 1 : 0.71-0.93, tin GNP 1 : 0.41-0.62, aluminium GNP 1 : 1.86-2.41, though rates of increase will vary widely from one country to another.

Iron Ore

Of world trade amounting to 80,000,000 tons of iron ore in 1955, the U.K. took nearly 13,000,000 tons, of which over 30 per cent came from Sweden and almost a quarter from Algeria, Morocco and Tunisia. Canada, with 11 per cent, was Britain's largest Commonwealth supplier, Sierra Leone also supplying 5 per cent. More recently, the share of these two countries has increased to nearly a quarter. Of the 32,000,000 tons imported by EEC countries in 1955, 40 per cent came from France and about 30 per cent from Sweden, Europe being a small market for Commonwealth exporters other than Sierra Leone. Canada exports chiefly to the U.S.A., Malaya and Japan; India exports more widely. Ownership of production facilities and investment greatly determine source of supply. Customary usage and type of ore are also major influencing factors.

In general, it is thought that European integration will make relatively little difference to the Commonwealth, its only real effect being to encourage the exploitation of African iron ore, though much of this would have occurred in any case, albeit perhaps more slowly. In this area, the U.K. will be among the exploiting countries. Both Canada and Sierra Leone can expect to increase their exports as a result of European integration, Sierra Leone particularly being likely to benefit as the Tonkolilli ores are developed. Elsewhere India is expected to increase her exports to Japan to about 6,000,000 tons (three times her total 1958 exports of iron ore) and Malaya should be able to export twice as much in 1970 as in 1958. Sales of iron ore will represent a substantial and increasing source of foreign exchange income to Commonwealth countries. The pattern of trade is unaffected by tariffs or quotas.

Copper

As in the case of iron ore the copper market is to all intents and purposes free but the trade pattern is still more markedly influenced by ownership of production facilities. Mexican, Peruvian and much of the Chilean and Canadian output is controlled by leading American firms, Rhodesian output is handled by the Selection Trust and Anglo American while the Congo was controlled by the Belgian SGM de Hoboken. U.S.A. is the largest producer and importer. Europe gets about half its requirements from Africa and almost as much from the Americas. The U.K. is Rhodesia's and the Commonwealth's major market and imports over half the Commonwealth copper exported to Europe, but re-exports refined copper to the Continent. Though U.K. Commonwealth imports are lower than in 1954, imports into the EEC have risen yearly, partly perhaps because less copper is shipped via the U.K. but more especially because EEC consumption is rising faster than British. Congo copper also percolates through Belgium to other Continental countries.

Minimum world growth in import demand for copper is expected to be not far off 3 per cent annually (perhaps 4 per cent in Europe) and the Commonwealth is not expected to lose through European integration. Congo production may be stimulated slightly by the EEC but will not displace Commonwealth copper now going into the Common market and will only affect slightly any potential Commonwealth sales that might otherwise have accrued without such stimulus.

Wider European association, says The Economist Intelligence Unit, could only benefit Commonwealth copper producers. For every additional 1 per cent in GNP growth in the U.K., consumption is expected to rise by 5,300 to 8,800 tons and, of this, 3,700 to 6,150 tons will almost certainly come from the Commonwealth. Participation in a wider European association would, it is thought, add at least 2 per cent to the U.K.'s GNP by 1970. Commonwealth sales to other European countries might also benefit.

Lead

Commonwealth lead producers have been more concerned with secular trends unfavourable to lead as a metal than to the effects of European integration, but overseas exporters tend to fear that integration will add another unfavourable factor influencing sales. U.S.A. absorbs about 40 per cent of free world supplies, EEC 25 per cent and the U.K. 17 per cent. The U.K.'s imports are in the form of metal and it draws 80 per cent of its supplies from the Commonwealth for which it is a major market. EEC is the Commonwealth's chief market for ore. The continental countries of EFTA have domestic supplies and import neither ore nor metal from the Commonwealth. Again, ownership is important but tariffs are not, though there is a CM tariff of about 6.5 per cent on lead metal, with special tariff-free quotas for a part of the requirements of Germany and Benelux.

Forecasts indicate that by 1970 there may be some excess of supply as between traditional exporters and importers, but this may be taken up by underdeveloped countries. It is not expected, however, that much loss from over-supply would fall on Commonwealth producers. In the absence of duty on ore, lead smelted in the CM from imported ore would be more competitive than overseas metal and would compete on equal terms with lead smelted from CM ore. So long as the Commonwealth re-

mains principally a supply of ore to the Six it should not be largely affected by the EEC tariff on lead metal, even in conditions of over-supply. Should the Commonwealth export more metal it has the advantage of being a low-cost producer, especially so far as Australia, the largest Commonwealth exporter is concerned.

In the event of a wider European association, promoting a higher rate of growth in the U.K. and enlarging the market for Commonwealth lead, any loss caused by the EEC tariff would be more than offset in gains from higher sales to Britain, assuming such an association gave no substantial tariff protection to European producers.

A book entitled "The Commonwealth and Europe" has recently been produced and published by The Economist Intelligence Unit. Priced at 42/- it contains 606 pages. The book is intended to fill the gap in the knowledge available on the economies and trade of the countries of the overseas Commonwealth in the context of European integration. It examines all the main commodities and countries in turn and their prospects for trade and development in the next ten years. This review is confined to the section dealing with ores and metals

Zinc

Britain is the Commonwealth's most important customer, buying almost all its zinc ore from Australia and two-thirds of its metal principally from Canada. EEC has taken almost as much ore from the Commonwealth as from its own overseas and associated territories, but has taken little metal. Belgium is the largest exporter of metal to the Six and to Europe. Among the five Continental EFTA countries, Norway is almost the sole importer of ore, which it smelts and re-exports. All five import metal, largely from Europe, the U.S.A. and Mexico. The U.K. is the only sizeable European importer of zinc metal from non-European sources and Commonwealth Preference is regarded as important. EEC tariffs are as for lead metal. Australian producers would regard a merger of the U.K. and EEC tariffs as very damaging, but EFTA is not regarded as a threat, though hardly welcomed as beneficial.

The Economist Intelligence Unit believes that U.K. participation in a wider European association on terms which would permit the Commonwealth to retain its current share of the U.K. market, would, by raising the rate of economic growth and therefore the demand for Commonwealth zinc, probably have the effect of cancelling out any loss in the EEC and also the loss of export earnings due to the elimination of Commonwealth Preference. The balance, either way, would probably be small but growth of world zinc import demand, at 2 to over 3 per cent annually, promises steady sales growth and Commonwealth exports should benefit.

Tin

The tin situation is not expected to be much affected by European economic integration since tin ore is not produced in Europe. There are neither ore nor metal tariffs or quotas in the major European countries other than Italy and the EEC will not introduce duties. Trade is and will be governed by location, ownership, past ownership and smelting facilities. The smelting countries, Germany, Holland, Belgium and the U.K., import tin ore from overseas and the rest of Europe imports metal mainly from smelting countries. Malaya, the world's largest producer, smelts its own and most of the ore produced in Thailand, selling, exceptionally among the tin-making countries, to the U.S.A., Japan and elsewhere.

While over-production is feared, the operation of the International Tin Agreement could keep the world market in balance around 1970 and Malaya should take a full share of larger world tin trade. China could upset the world market, but is not thought likely to do so.

Aluminium

Although three out of the four Commonwealth bauxite and/or alumina exporting countries supply Europe, shipments from Jamaica and Canada to Norway and Sweden absorb only a fraction of total sales, though Ghana ships almost exclusively to the U.K. Nevertheless, these exporters are aware of the dangers of a high EEC tariff and the vast production potential overseas. In respect of aluminium metal, the U.K. is heavily dependent on Canada whence increasing quantities have been sent to Continental Europe since 1954. Norway and Russia have, however, reduced Canada's share of the total European import market from 70 per cent in 1955 to less than 50 per cent in 1958. (The U.S. has since become a major exporter to Europe.—Ed.)

Although there are signs that the phenomenal increase in supply and demand over the last half-century is slackening, aluminium will remain the most expansionary of the major metals.

EFTA makes very little difference to the set-up. In the EEC countries the tariff has been set at 10 per cent, while Germany and Benelux are entitled to open quotas, to the full extent of the requirements for their processing industries, dutiable at a rate of 5 per cent.

Wider association between Six and Seven involving tariff harmonization appears impracticable should French and Belgian African production be surplus to EEC requirements. Otherwise a duty-free quota for Canadian metal and strict origin system might only complicate matters a little for Commonwealth producers.

Though Jamaica was disappointed at the failure of the project for a European Free Trade Area including all OEEC countries, which would have helped her alumina shipments to Norway, The Economist Intelligence Unit believes that the long term increase in Jamaican exports is likely to be so large as not to be seriously affected by this. Though Canada will greatly increase its exports of metal, the development by EEC countries of known resources in Africa would preclude increased sales to the Six. India will increase production, but only for the home market, while Australia has decided to exploit the Queensland bauxite deposits. Finality has almost been reached in the project for a reduction works in Ghana as part of the Volta River Scheme.

In general, the impact of EFTA on imported ores and metals will be small, while the CM tariff will also have little effect and the predominant influence will be expansion of growth of demand.

In the event of a merger between EFTA and EEC Britain could throw her weight on the side of policies benefiting Commonwealth trade. Most imported ores and metals already enter Europe duty-free. In respect of lead and zinc metal for which a tariff applies, as previously mentioned, it is considered by The Economist Intelligence Unit that the best solution would be to abolish the common tariff and to use a subsidy for any production judged necessary for Continental smelters or to allow free entry into the U.K. of Commonwealth lead and zinc metal, plus an origin procedure. In the case of aluminium, the entry of this metal from any of the plants set up in associated African territories of EEC countries would be tariff-free and, therefore, free entry into the U.K. from the Commonwealth should also be possible.

Machinery and Equipment

The Miniveyor

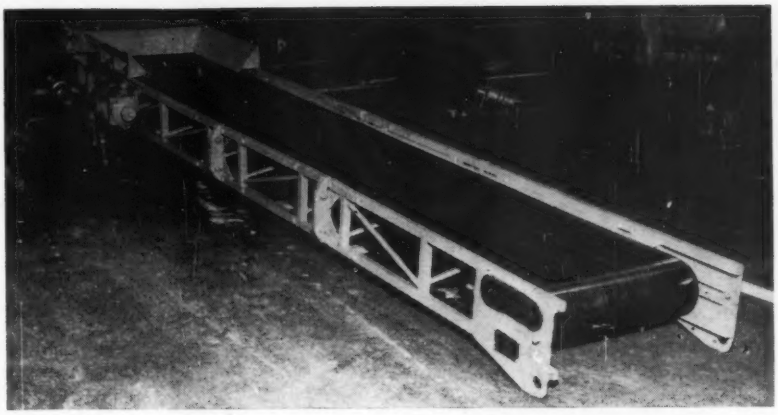
Mechanized longwall faces normally require the provision of stable holes at the ends of the face to provide room for the turning and reversal of the loading machines and the advance of conveyor gearheads and tailends. The maintenance of these stable holes in advance of the face, frequently with hand-casting of the coal, is expensive in manpower, particularly on those faces which are moving forward rapidly on more than one shift per day.

The new Joy-Sullivan Miniveyor has been designed with a view to reducing the work required in loading out the coal at this point, and the manpower required to perform the operation.

The unit will also have application for other underground duties. For instance on single-unit faces, it can be used to convey the rib-side coal adjacent to those maingates where rib-side packs are required, and thus eliminate hand-casting. In bord and pillar operations it can be used for the initial drivage of break-throughs, etc., before normal conveyor units are installed. In short, it can be advantageously employed for the conveying of coal and stone short distances, when the features of portability and compactness are desirable.

The Joy Miniveyor is a strong light portable unit comprising a belt-carrying framework, at one end of which is located a combined electric motor and drive pulley assembly, and at the other a return pulley adjustable for belt tensioning purposes.

The framework is of lightweight all-steel welded construction. The belt is carried on stainless steel strips running the entire length of the frame and positioned to give suitable troughing characteristics. A removable hopper is positioned above the driving drum to facilitate coal filling. Various lengths are available from 9 ft. 1 in. to 21 ft. 5 in. overall, with drum centres of 8 ft. to 20 ft. 4 in. An 18 in. wide belt running at 175 f.p.m. is capable of conveying coal at 50 t.p.h. The whole unit is mounted on castor wheels which give ease of movement in any direction.

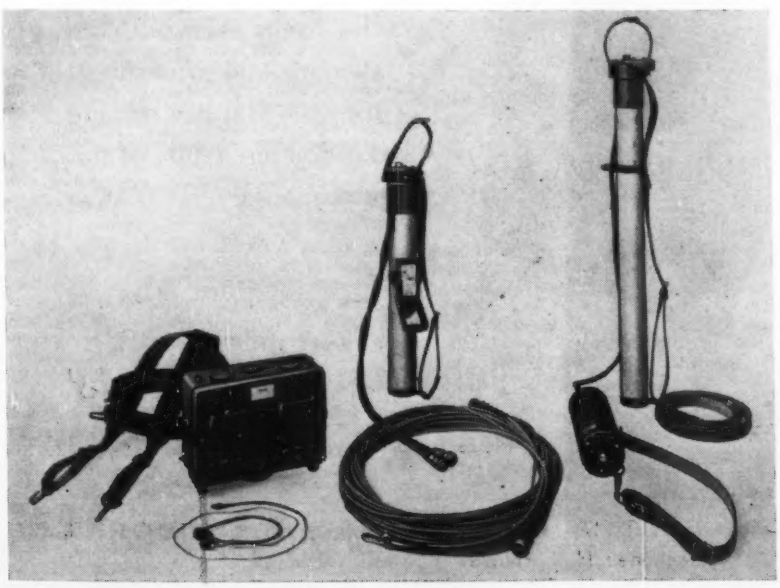


The Miniveyor by Joy-Sullivan

The driving unit of the conveyor, operated from a standard drilling panel is a 2 H.P. motorized driving drum. This drum embodies its own Buxton Certified F.L.P. electric motor, combined with the necessary reduction gearing, and the motor leads are brought out to a junction box mounted on the side of the conveyor. The arrangement gives a compact unit with a minimum of working parts, and an overall width of only 2 ft. 8½ in.

ELECTROMAGNETIC PROSPECTING

The E.M. Gun by AB Elektrisk Malmletning, Sweden, is a lightweight, extremely portable, two-man operated equipment for reconnaissance and detailed surveys in ore prospecting by the electromagnetic inductive method. The gun makes use of the fact that electrical conductors, when subjected to a primary alternating electromagnetic field, create secondary fields whose phase and amplitude differ from those of the primary applied field. By detecting and measuring these differences, the presence and location of the conductors may be established even when these are buried at some depth under the surface. In E.M. Gun surveys the primary field is set up by a transmitter unit comprising transistorised oscillator and a transmitter coil wound on a ferrite core (the transmitter staff). The measurements are made with a receiver unit comprising a compensator-amplifier and a receiver staff.



The E.M. Gun equipment

The E.M. Gun equipment now available incorporates field experience from many parts of the world, and its design and construction are based on the lessons learnt by The ABEM Co. in the progressive development of equipments and methods for electromagnetic ore prospecting. The E.M. Gun may be used both for pin-pointing anomalies detected by airborne electromagnetic surveys, and for obtaining detailed information about the conductors so located.

The transistorized, battery operated oscillator, which is fitted with a desiccator and which is watertight, operates at two frequencies. This allows the operator to obtain more details about the conductor and makes it possible to discriminate between types of conductors.

A choice of frequencies, 1,760 and 440 c/s or 3,520 and 880 c/s, is available. Both operating frequencies can be tuned in the field for optimum results. The total weight of the oscillator and the transmitter staff is only 9.6 kg. (21¼ lb.).

The compensator-amplifier unit which is fitted with a desiccator and which is watertight has been considerably improved and the amplifier batteries are now fitted internally instead of in a separate battery box. Audio and visual null methods for obtaining field measurements are provided, and the compensator is calibrated so that the scale readings show directly the in- and out-of-phase components as percentages of the normal field at the selected transmitter/receiver staff separation. The total weight of the compensator-amplifier unit and the receiver staff is only 8.8 kg. (19½ lb.).

The E.M. Gun may be used in all field conditions, and the staff separation is variable within wide limits. Four adjustable rheostats, two for each operating frequency, make it possible to calibrate the compensator in the field in a matter of minutes so that any two staff separations to cover from 30-90 metres or 100-300 feet may be selected by throwing a switch.

When making measurements of the inclination of the field the transmitter and receiver may be separated by up to 300 feet for the E.M. Gun 17/44 and by up to 450 feet for the E.M. Gun 35/88.

With the E.M. Gun equipment a depth penetration of about 0.7 times the staff separation is obtained over vertical or steeply dipping sheet-like ore bodies, while over horizontal or flatly dipping conductors a pentration of about 1.5 times the staff separation is to be expected.

COPPER DETERMINATION

A new method of determining the copper content of an orebody is now being used experimentally at Nchanga, Northern Rhodesia. A special paint—in appearance similar to white enamel paint—is aplied to the rock over a given distance and width. After a certain time, usually about two minutes, the paint reacts with any sulphide copper in the rock to turn various shades of blue. The exposure in blue is then multiplied by an ore factor (determined separately on different mines) to give the percentage of copper contained in the rock.

At present the paint works only on application to sulphide ores. Its chief advantage is that a rough assay, which clearly distinguishes ore from waste, can be made on the spot.

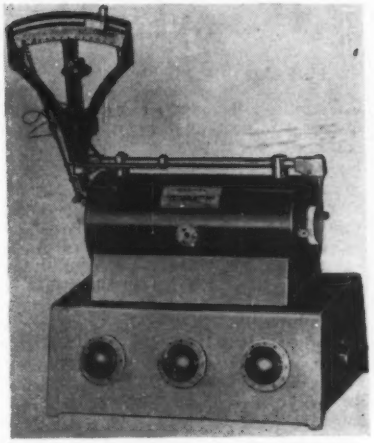
The paint is being tested by consent of Mangula Copper Mines, near Sinoia in Southern Rhodesia, the patentees.

HIGH-PRECISION LABORATORY FURNACES

A range of precision laboratory furnaces with high stability of temperature (± 0.25 deg C.), an interchangeable drum control for thermal cycling, and facilities for heat loss compensation at the ends of the tube, have just been introduced by Shandon Scientific Co. Ltd.

In the standard range there are three models for maximum temperatures of 1,050 deg. C. with tube sizes respectively of 35 mm. I.D. x 290 mm. length (for operation on 115 V. a.c.), 60 mm. x 450 mm. (220 V. a.c.) and 75 mm. x 700 mm. (220 V. a.c.); and two models for maximum temperatures of 1,250 deg. C., with tube sizes of 35 mm. x 290 mm. (115 V. a.c.) and 60 mm. x 450 mm. (220 V. a.c.). Two special models for maximum temperatures of 1,500 deg. C. are also available, with tube sizes of 16 mm. x 250 mm. (115 V. a.c.) and 35 mm. x 400 mm. (220 V. a.c.).

The furnaces are of versatile design. The standard models may be controlled either by a thermostatic regulator or a chronograph drum control for thermal cycling, these temperature-control arrangements being easily interchangeable by the user.



The Chevenard - Joumier precision furnace with thermostatic regulator

The thermostatic regulator is a mechanism enabling the furnace temperature to be controlled within ± 0.25 deg. C. at any desired level below the maximum. The device consists of a graduated scale and a pointer operated by a dilatable wire running through the furnace body. The scale is fitted with a stop which may be set to any desired temperature. When the pointer reaches the stop, the current is automatically cut off from the windings via the 8-v relay. The temperature is set initially with the aid of a thermocouple. The thermostatic regulator is interchangeable on the standard models with a chronograph drum control for thermal cycling.

REVISED STANDARDS FOR ROCK DUSTING

New standards for rock dusting to prevent explosions of bituminous coal and lignite dust in underground mines have been approved by the U.S. Bureau of Mines and the American Standards Association. A study, sponsored by the Bureau and carried out by an A.S.A. committee, revealed that former rock dusting standards, adopted originally in 1925, are largely obsolete because of increased mechanization and other advancements in coal mining.

The new standards prescribe how rock dust (powdered limestone) should be applied for maximum effectiveness and how rock dusted areas should be sampled. They also contain a section defining rock dusting terms and include an appendix describing a suggested laboratory method for testing the caking tendency of rock dust. Those interested in the new standards can obtain them in Bureau of Mines Information Circ. 8001, *American Standard Practice for Rock Dusting Underground Bituminous Coal and Lignite Mines to Prevent Coal Dust Explosions (ASA Standard M13.1—1960, UDC 622.81)* from the Publications-Distribution Section, U.S. Bureau of Mines, 4800 Forbes Ave., Pittsburgh, 13, Pa., United States.

One Hundred Years of Mining Equipment

For Qualter, Hall & Co. of Barnsley, November 1, 1960, marked the completion of the fiftieth year as a limited company, and it was also the centenary of the granting of a patent covering a unique type of piston, designed by George Bower, a moulder in Droylesden. This piston was to provide the base for Qualter Hall's early trading activities.

John Qualter, a blacksmith in Dukinfield, was called on for his advice, and, they were soon joined by Edward Hall, who had just completed his training as an engine fitter. Together they established their own works in Barnsley, in 1867; Edward Hall's descendants have controlled and directed the company to this day as a family concern, and its story is told in *A Handful of History*, by Mr. Philip J. Hall, a present director.

As a result of the successful expansion of piston sales, Qualter Hall specialized in the building of steam engines, their first order coming from the Denaby Main Colliery Co. in 1872. The company early began supplying engines of many varieties mainly to the nearby collieries of Yorkshire, and soon proceeded to develop designs for ram pumps, and eventually to a wide range of hydraulic equipment. Around the turn of the century, Qualter patented a friction driven roll crusher, and, together with Edward Hall, produced new designs for coal preparation equipment.

During the first world war, the government placed colliery equipment as of top national importance, and after the war the company, as part of their expansion programme, were able to acquire the works, which they named Railway Foundry, and which still, with various additions, house the company.

Between the wars Qualter Hall widened the range of their activities, particularly in the field of electric arc welding, which was then a comparatively new technique. They never, however, slackened in their interest in colliery designing, and among other contracts, included one for a completely new type of screening plant at Barnburgh Colliery in 1936. Skip winding plants, which had until then been installed mainly by German engineering firms, were another field of the industry in which Qualter Hall forged ahead, when they applied for permission to manufacture under licence, for skip winding requirements in this country.

The years following world war II saw Britain's biggest colliery re-equipment programme, in which Qualter Hall concentrated on three groups of products, skip winding plant, mine car handling equipment, and spiral staple chutes, the last two unknown in British collieries before 1947. In co-operation with the Lofthouse Colliery Co., they produced a new all-electric decking plant later to be known as the Lofco mine car handling system, the execution and detail design being the entire responsibility of Qualter Hall & Co.

During the past twelve months Qualter Hall have been developing new products, including a complete newly designed range of pneumatic control equipment, as part of their policy of reducing their dependence of the coal industry.

MINING MISCELLANY

It is reported that the Nigerian Coal Corporation have not succeeded in obtaining the necessary import licence for exporting Nigerian coal to Japan.

★

A new company, Shamrock-Avoca, Ltd., consisting of Shamrock Fertilizers of Wicklow, St. Patrick Copper Mines of Avoca and Canadian interests, has been formed to set up a £4,000,000 industrial chemical plant at Campile, County Wexford, Eire. The plant will use as raw materials the copper pyrites produced in the Avoca mines, and will produce 115,000 tons of 100 per cent acid annually, as well as types of fertilizers and various industrial chemicals for home and export markets. Work on the erection of the new factory is scheduled for mid-1961.

★

An official of Patino Mines stated recently in New York that the Patino group of tin mines in Bolivia, nationalized by the Bolivian Government in 1952, had received a $6,000,000 settlement offer, payment to be spread over an eight-year period, from the Bolivian Government, with whom negotiations were still proceeding. The offer was additional to the retentions already received from Bolivia since 1952.

★

In our issue of September 16, 1960, we quoted Mr. Frederick Hackett, New Zealand Minister of Mines as stating that the U.K. Atomic Energy Authority would not proceed further in New Zealand, since no deposits of uranium economic at current prices had been disclosed in that country. Commenting on this statement, the correctness of which is not disputed, a letter jointly signed by Mr. T. J. McKee, managing director of Buller Uranium Ltd., and Mr. L. D. McAlister, chairman of Uranium Valley Ltd., emphasizes that the A.E.E. investigated only one uranium occurrence in New Zealand. The letter points out that prospecting in New Zealand is still at an early stage and states that other occurrences being actively investigated are considered to be promising. (A brief note on uranium prospecting in New Zealand, extracted from the 1959 report of the Mines Department, appeared in our issue of November 25, 1960, p. 599.)

★

Mining and milling operations for zinc at Silver City and Deming, U.S.A., jointly owned by American Zinc Lead Smelting Co., and Hydrometals Inc., were resumed on January 3. The facilities had been closed since 1956. Operations are expected to be at the rate of 20,000-25,000 tons of zinc concentrates during the first year. American Zinc, Lead and Smelting Co. is also planning to recondition and reopen by March 1961 its zinc mill near Cardin, Oklahoma, which has been closed for three years because of depressed zinc prices. It is planned to operate the mill at near capacity—25,000 tons of ore a month, ores being supplied by independent mine lessees located within trucking distance of the plant.

★

The total industrial use of ammonium nitrate, as a high explosive is reported to have risen in the U.S. to around 300,000 tons during 1960, compared with 37,000 tons in 1953, and is said to be still increasing.

As part of their scheme for the decentralization of existing facilities at Lincoln, Ruston-Bucyrus have recently opened their fourth sales and service depot. The new Glasgow depot, pictured here, will carry spares for all the company's excavators, including spares for the corresponding Ruston engines

★

Large-scale mechanization at a cost of about £1,000,000 of the iron ore mine at Thabazimbi, owned and operated by the South African Iron and Steel Corporation (Iscor) has increased the production rate, according to a recent issue of "Iscor News". Previously the steelworks at Pretoria required 30,000 tons of iron ore weekly, but Thabazimbi is now expected to produce 35,000 tons a week. Five mining units, each consisting of a gathering arm loader and two diesel-electric shuttlecars are now used in the Eastern Section of the mine, with two units in reserve. One unit, requiring only three semi-skilled operators per shift, can produce 1,000 tons of ore a day. Nearing completion at Thabazimbi are two vertical shafts, to transport men and machines, from various levels.

★

Following a visit to India last summer by experts of the National Coal Board, the U.K. Government has offered technical and other aid for the development of three deep underground coal mines in India. The U.S.A. has offered to develop some opencast coal mines, and West Germany to erect and maintain a factory for the production of coal mining equipment. The French Government has offered to provide technical field training for which ten Indian engineers are already in France.

★

Craigmont Mines, 14 miles northwest of Merritt, British Columbia, is to be put into production with a 4,000 ton mill. According to *Northern Miner* the gross value of production will approximate $14,000,000 annually with copper at 25 c. a lb., or $17,000,000 if copper averages a price of 30 c. per lb. Initially mill feed will come from open pit operations, which will be at a rate of 5,600 tons per day on a five-day week, in order to maintain the mill at 4,000 tons over the full 7-day week. Later, open pit operations will be cut back to 4,000 tons daily, with 1,600 tons coming from underground. Reserves of semi-proved and probable ore are now figured at a total of 22,575,000 tons, averaging 2.08 per cent copper and 19.6 per cent iron. Included is 8,635,000 tons grading 1.82 per cent copper and 19.2 per cent iron, which is available for open pit mining.

★

Coast Copper Co., of Canada, controlled by Consolidated Mining and Smelting Co., has contracted for the sale of its copper concentrates to Japanese interests for a five-year period starting in 1962. The concentrates will be smelted and treated by Mitsubishi Metal Mining Co. and Dowa Mining Co. The contract is estimated to involve output worth over $18,000,000, delivery prices to depend on world markets. Coast Copper has preparatory work well under way for construction of a 750-ton capacity concentration on the company's property at the northern end of Vancouver Island.

★

It is reported that Indo-Japanese negotiations for a new iron ore contract for 1961 have reached an impasse. Japan desired to buy 2,000,000 tons of Indian ore during 1961, but was not agreeable to the price of 84s. per ton f.o.b. demanded by the State Trading Corporation, which had raised the price from that of 80s. paid in 1960. The price had been reduced from 84s. to 80s. in 1958, during the steel recession, but although world steel production had been better since then, the price had not hitherto been raised to Japan. It is understood that India has been exporting iron ore to other countries, including Communist countries, at substantially higher prices than 80s. per ton, and in larger quantities than those required by Japan. Official sources say that negotiations are still proceeding.

★

Reservations are now being received for the 1961 Coal Show organized by the American Mining Congress, which will be held in Cleveland, Ohio, May 15-18, 1961. This is the last time that the Coal Show will be an annual event—in future it will take place every three years, the next being arranged for 1964.

★

Details and applications regarding the Travelling Bursary for a study tour of Swedish mines, mentioned in our issue of December 30, may be obtained from the Secretary of the Institution of Mining and Metallurgy, London.

Personal

The National Coal Board have appointed Mr. A. H. Kellett to be chairman of their South-Western Division in succession to Mr. D M. Rees, whose impending retirement has already been announced. Mr. Kellett is at present deputy chairman of the Board's Durham Division.

★

Mr. I. S. Whiteman has been appointed to the board of directors of NCK-Rapier Ltd., in London, the sales organization for Newton Chambers and Co., of Sheffield and Ransomes and Rapier at Ipswich. Mr. Whiteman will continue as general manager.

★

Mr. J. P. V. Woollam was appointed deputy chairman of Simon-Carves on December 12, 1960. Mr. Woollam is also director of the holding company, Simon Engineering, and of a number of subsidiary and associated companies.

★

Mr. C. R. Wheeler (chairman, Guest Keen Iron and Steel Co.) additional vice-chairman, Associated Electrical Industries, and a director of The Steel Company of Wales) will succeed Mr. R. F. Summers (chairman, John Summers and Sons), as president of the British Iron and Steel Federation on January 1, 1961. The Council of the Federation has also signified its intention of appointing Sir Julian Pode (managing director, The Steel Company of Wales), as president-elect of the Federation for 1961.

★

Mr. R. R. Kennan is to join the board of Ferry-Diamond Engineering Co., of Southampton. He will still retain his directorships of Mono Pumps Africa (Pty)., and Mono Pumps (Australia) Pty., and the general sales managership of Mono Pumps Ltd., London.

★

The National Coal Board announce the appointment of Mr. F. G. Glossop as deputy chairman of their East Midlands Division. Mr. Glossop who is production director of the Board's North Western Division, succeeds Mr. W. L. Miron, who will become chairman of the East Midlands Board on January 1, 1961.

★

BTR Industries announces the appointment of Mr. A. Kennaway as controller of technical operations.

★

Michigan (Gt. Britain) announce the appointment of Mr. John A. Hall as export sales manager.

★

Mr. Arnold Lindley is to succeed Sir Leslie Gamage as chairman of the General Electric Co. at the end of 1960. He is at present vice-chairman and managing director, and will retain the latter appointment.

★

The death is announced of Mr. Francis Robert Peters, chairman of Rhodesian Corporation, and Oceana Development Co., and a director of Bremang Gold Dredging Co.

Company News

David Brown have announced that their licence to manufacture tractors for India has now been amplified to cover their 850 and 950 Implematic tractors, of 35 h.p. and 42.5 · h.p. respectively. Manufacture will be carried out by David Brown Mahindra Tractors (Pte.), a company jointly owned by David Brown Tractors and its Indian distributors, Mahindra and Mahindra of Bombay. A new factory is now being built near Bombay to undertake the increased production.

★

Atlas Equipment Co., of Salt Lake City, U.S., have been appointed dealers for equipment manufactured by Harnischfeger Corp. of Milwaukee. The Harnischfeger Corp. have also announced that Dalworth Machinery Co. have joined their construction and mining division sales organization.

★

The East-Midland's Division of the N.C.B. has placed an order with Heyes and Co. of Wigan for two 2-level Wigan 40 shaft signalling indicator systems for installation at Blidworth Colliery, Notts., similar to systems already supplied to nine other N.C.B. collieries.

★

A short *Guide to the Drafting of Specifications for Rubber Products* has been published by the Federation of British Rubber and Allied Manufacturers, who will supply it free of charge on demand.

★

The Gas Council states that enquiries upon general matters concerning the gas industry should be addressed to the Press and Information Office, The Gas Council, 1 Grosvenor Place, London, S.W.1. Tel.: BELgravia 4321.

★

Sandvik Swedish Steels of Halesowen, have opened a new distribution depot at East Kilbride, near Glasgow.

★

George Wimpey and Co. announce that they have been given a contract for mine drivages from the North-Western Division of the National Coal Board's new colliery at Parkside, Lancs. The work, which involves 10 miles of tunnelling and includes 40 junctions, will start on March 1, 1961, and is part of a £2,000,000 scheme for underground development.

★

Chloride Batteries are transferring the major portion of their sales headquarters from London to the head office and principal manufacturing centre of the company at Exide Works, near Manchester on January 2, 1961. A London sales office for automotive equipment, government and dry battery business will be maintained at the present address in London, until January 30, 1961, when it will be transferred to 137 Victoria Street, London, S.W.1. (Tel.: VICtoria 2299). Mr. A. C. Stewart, the present sales manager, who is approaching retirement age, will be succeeded by Mr. M. A. Griffith-Jones on completion of the move, but his services will be retained by the company as consultant until he retires.

G. A. Harvey and Co. (London), have moved the sales head office and new showrooms to Villiers House, Strand, London, W.C.2. (Tel.: WHItehall 9931/7). A booklet "The Harvey Team" has recently been published by G. A. Harvey and Co., to give an overall insight into the companies activities and personnel.

★

The Electric Resistance Furnace Co., a member of the EFCO group of companies, has changed its name to EFCO Furnaces Ltd., on December 1 last. The change was made as the company's interests have now widened to include both gas and oil-fired furnaces.

★

John Brown and Co., announce that their subsidiary company, John Brown (S.E.N.D.) Ltd., have concluded an agreement with DEMAG A.G., Duisberg, for the manufacture and supply in the U.K. of a wide range of iron and steel plant to DEMAG designs.

★

Dawe Instruments announce that they have been granted sole agency for the range of electronic instruments made by Promesur of Paris.

★

Stothert and Pitt of Bath, announce that they have entered into an agreement wih Ellicott Machine Corporation of Baltimore, U.S., for the manufacture, under licence in the United Kingdom, of dredges of all sizes and types in accordance with Ellicott designs and specifications. At the same time, Ellicott announced that it would be represented in a sales capacity in the U.K. by John Blackwood Hodge and Co.

★

Aveling-Barford Australia Pty., have taken over their new factory and offices recently completed at Revesby, 16 miles from Sydney, N.S.W. Part-manufacture of road rollers, motor graders and stone crushers is now concentrated in the new plant.

★

The board of directors of Saunders Valve Co., announce that they are negotiating with the Netherlands Authorities for the establishment of a branch of business in Leeuwarden, Friesland, to provide improved service of the company's products in the European Common Market. This decision will not affect the level of employment at the company's head office and principal works in Cwmbran and Newport, Mon., where further developments to increase production are under consideration.

★

Head Wrightson & Co., announce that they are registering a wholly-owned subsidiary, Head Wirghtson India, with administrative headquarters in Calcutta, to handle their expanding interests in India. It will act as a contracting company for the supply as far as possible from Indian sources, of various types of plant to the designs of the parent company. The chairman of Head Wrightson India will be Mr. Peter Wrightson, who is also vice-chairman of Head Wrightson & Co., and Mr. Vaughan Pendred has been appointed managing director.

Metals and Minerals

The London Gold Market in 1960

The year 1960 saw London consolidate its position as the most active and best-supplied gold market in the world, states the annual circular of Mocatta and Goldsmid, bullion brokers and dealers in the City of London since 1684, and now a subsidiary of Hambros Bank Ltd. The structure of the market, states the circular, was found to be proof against the exceptionally violent strains to which it was subjected.

Commenting on the sudden activity in gold and the sharp increase in price during October, Mocatta and Goldsmid conclude that all gold sold in London since October 19 has gone into hoard, since central banks are precluded by the rules of the International Monetary Fund from buying at more than $35.35. The demand for small bars has been large enough to strain the capacity of London refiners and there has been a considerable increase in the demand for sovereigns.

On October 24 the sterling price rose to 270s., the highest official price of the year in London, equivalent to $38. But an executive director of the Bank of England was already paying an unobtrusive visit to Washington and, by the end of the month, not only had the dollar price relapsed to $36, but the market had somehow recovered its poise. In November, demand began to fall away even before the result of the U.S. Presidential Election was known and, in apparent contradiction to previous anticipations, it went on falling afterwards. A balance was reached somwhere between $35.60 and $35.80, and in December the price still drifted downwards, with occasional but only moderate reactions.

*

U.S. gold holdings fell by $1,919,000,000 in 1960 as a result of sales to foreign governments and central banks, according to New York Federal Reserve Bank figures. This was the second largest annual outflow in the country's history. In 1958 the U.S. lost $2,247,000,000. Last year's gold outflow was reduced by a $300,000 gold purchase by the Treasury early in December from the I.M.F., the net decline for 1960 being thus $1,919,000,000.

SILVER IN GROWING DEMAND

On the subject of silver, Mocatta and Goldsmid state that, though the market had a dull year, there is a steady undertone which indicates that those who take a longer view are inclined to foresee a deficiency of silver which will make itself increasingly felt in the quotations of the London market.

Demand has again exceeded the current supply of newly-mined silver, with the result that the free stocks held by the U.S. Treasury fell to a level at which they would seem to be no more than sufficient for about three years to come. Under the existing law, the U.S. Treasury might even cease to sell silver to American industry without waiting for its free stocks to be exhausted.

In the last days of December forward silver was quoted at ¼d. premium over spot, which was the first time a premium had been established since the war. Throughout the year it was noticeable that much more forward silver was being bought for domestic consumers, and in the second half of the year there was forward buying which could be interpreted as a currency hedge.

At slightly over 16,000,000 oz., the domestic turnover was a little smaller than in 1959, due to some slowing down of British industry in the second half of the year; but it was still substantially greater than in 1958.

HIGHER ANTIMONY PRICES

With effect from January 1, 1961, U.K. domestic antimony metal prices have been increased by £10 per ton. The new prices are £217. 10s. and £210 per ton delivered for the 99.6 and 99 per cent grades respectively. Prices last changed on September 12, 1960, when they were increased by a similar amount. Antimony crude 70 per cent remains unchanged at £190 per ton delivered.

It remains to be seen how China and Russian will react to the latest increases, which reflect the continued firmness of the open antimony ore shipment market. For basis 60 per cent material about 26s. per l.ton unit c.i.f. Continent has lately been indicated. Demand generally has been good and has tended to emphasize a rather tighter supply position. The U.K. price has also firmed up a shilling or two in recent months and now stands at about 22s.-23s. per l.ton c.i.f. for basis 60 per cent. Most of the U.K.'s ore supplies are obtained from the South African producer, Consolidated Murchison, under long-term contracts.

CANADIAN NICKEL PRICE INCREASED

To compensate for recent changes in foreign exchange rates and to keep the domestic price of nickel in accord with the basic export price, International Nickel has announced a change of 2½ c. per lb. in its price of electrolytically refined nickel for consumption in Canada. Effective from January 1, 1961, the price is now 72¾ c. per lb. ex the Port Colborne, Ontario, refinery. The company's prices of nickel in all other markets remain unaltered.

G.E.C. MAKES ONE-CARAT DIAMONDS

General Electric (U.S.) has announced that for the first time synthetic diamonds over one carat in size have been made in its research laboratory in Schenectady. It would appear from the report that these diamonds, the largest so far produced by the company, are not as yet suitable for industrial use. This development, however, is obviously of great potential significance and its advent is enhanced by the chaotic situation in the Belgian Congo, where Forminière has, however, been able to resume production. General Electric's target of synthetic diamond production is understood to be 3,000,000 carats a year.

*

Further technical details have been released regarding the manufacture of synthetic diamond grit by De Beers Consolidated in South Africa. The Diamond Research Laboratory has reported that the bond employed is a sintered metal powder, either bronze alloy or iron powder (tungsten may also be used). The diamond grit sizes employed are from 16 mesh Tyler sieve series (i.e. 100/u. to 350/u.). The grinding wheels are made in three different bonds: metal, resinoid or ceramic (vitreous). Resinoid bonds are basically made from phenolic thermosetting resins. The grit sizes employed in grinding wheels range from 80 mesh to 325 mesh (i.e., 250/u. to 44/u.). In the manufacture of the metal bonds metal powders may be used or the bonds may be electrically deposited (usually nickel). Fillers such as silicon carbide, alumina, silica, cryolite, etc., are added to render resin wheels especially suitable for different grinding applications.

COMALCO INDUSTRIES

Comalco Industries Pty. Ltd., owned jointly by Consolidated Zinc and Kaiser Aluminium, has been registered in Melbourne with a nominal capital of £25,000,000. This development follows the announcement a few weeks ago that a new company was to be formed by the two partners to develop jointly an integrated aluminium industry in Australia and New Zealand (*vide The Mining Journal*, Dec. 2, 1960.)

*

Aluminium output in the U.S. in 1960 exceeded 1959 production by 3 per cent, according to the Aluminium Association, total production for the year being set at just over 2,000,000 s.tons. U.S. primary aluminium capacity, which stood at 2,402,750 tons at the beginning of 1960, had been expanded to 2,468,750 tons by October 1. Despite the completion of new reduction facilities, however, the picture was mixed. A softened demand trimmed output of established potlines, so that about 22 per cent of capacity is now unused. Aluminium ingot exports in 1960 set an all-time record, shipments abroad in the first four months exceeding the entire outbound tonnage of 1959. Over a ten-month period, exports of mill products showed an increase of 75 per cent over the corresponding period of 1959.

*

Output of crude aluminium in Norway was expected to reach some 160,000 tonnes in 1960, a new record and some 15,000 tonnes more than in 1959, predicted Mr. Nils Ramm, managing director of A/S Norsk. This record output was achieved despite power shortages caused by an unusually dry summer and autumn, which prevented full utilization of capacity.

A/S Ardal and Sunndal Verk, Norway's State-owned aluminium producer, has plans for a new smelter with an annual output capacity of 100,000 tonnes, states the firm's general director, Mr. Aage W. Owe. It is estimated that the projected smelter would take three years

to build and would cost 1,000,000,000 crowns, including the cost of providing the necessary hydro-electric plant. Mr. Owe said that the plans were still at an early stage; it had not been decided when and where the new smelter would be built.

Ardal and Sunndal's output in 1960 was expected to reach a record 112,000 tons of aluminium. Work continued on the current expansion programme at the Ardal plant, where capacity is being raised by 40,000 tonnes a year to 100,000 tonnes. The first of the new smelting furnaces is due to go into production in October next year.

★

A Reynolds Metal Co. subsidiary has agreed with Venezuela to form a jointly owned company that will build a reduction plant there with an initial yearly capacity of 25,000 tonnes of primary metal. The plant is expected to cost more than $30,000,000 and will be situated in the Caroni region of south-eastern Venezuela. The pact calls for a 30-year supply of hydro-electric power. The plant will be the first primary aluminium production unit in Venezuela.

★

According to Mr. James M. Smith, head of the engine section of Alcoa's Cleveland sales development division in an address to the New York section of the Society of Automotive Engineers, a motor car using 250 lb. of aluminium is not only possible today but is regarded as entirely probable within five years. Such a car, it was stated, could exist now if all the aluminium compounds used by car manufacturers in their various 1961 models were assembled within a single model. Assuming a 6,000,000 car year, use of the light metal in the U.S. on such a broad scale would require 750,000 tons annually, well over a third of the anticipated primary aluminium output this year. Calculated at rock bottom base metal prices, this would represent a $1,000,000-a-day business for the aluminium industry.

★

The longest aluminium railway car, 85 ft. overall, has been successfully freight-tested in a coast-to-coast run, according to the Harvey Aluminium Co.

GERMAN QUOTA PROPOSALS

New proposals for import quotas of metals in 1961 from countries not members of the European Common Market have been issued by the West German Government. These proposals, which still need the approval of Parliament, are as follows:

For aluminium, the quota is 110,000 tonnes on which duties of 5 per cent are to be levied. An equal duty is to be raised on the quota of 10,000 tonnes from Common Market countries, while 10,000 tonnes of aluminium waste are to be brought in free of duty.

Duty free quotas are to be set up for 16,000 tonnes of crude magnesium, 50,000 tonnes of crude lead, and 70,000 tonnes of crude and hard zinc.

INDIA'S MANGANESE EXPORT POLICY

While the steep decline in India's export of manganese ore has now been halted, a stable recovery has yet to be achieved. The government's new export policy will be valid for a period of three years in order to encourage long-term sales. In order to co-ordinate movement capacity with export potential, and to ensure supplies of ore according to the qualities and schedule of deliveries desired by overseas buyers, the policy lays down that all export transactions of manganese ore will have to be registered with the State Trading Corporation. A copy of the relevant sale contract should be filed for this purpose with the S.T.C.

The importance given to the S.T.C. as a kind of super exporting agency has caused widespread dissatisfaction in trade circles. It is pointed out that the S.T.C., which has been awarded a virtual monopoly in the export of manganese ore, is in competition with the normal trade channels, and that empowering it to secure the sale contracts of private traders by executive fiat is not calculated to bring out the best from the private sector. The trade feels that the S.T.C., which was ostensibly brought into the picture to supplement normal trade channels, has now come to supplant them, and in the process a major foreign exchange earner such as manganese ore has been pushed into the doldrums.

Copper · Tin · Lead · Zinc

(From Our London Metal Exchange Correspondent)

The past week, interrupted by a holiday on Monday, has seen very little alteration in market sentiment although prices of tin, lead and zinc have shown some improvement.

NEW LEAD AND ZINC CONTRACTS

At the turn of the year history was made when the new lead and zinc contracts came into full operation and, although there are still people who feel that the break with tradition is wrong, all members are determined to make a success of the change. It is felt that after an initial period, probably lasting throughout January, dealings should become free from unusual technical considerations and that turnovers are likely to increase. The commencement of the "in warehouse" contracts comes at an opportune moment as, with stocks of lead and zinc increasing, the financing of them is much more likely to be done through the market than if the old "ex ship" delivery had been continued.

Lead stocks at the end of December were reported as 6,926 tons and zinc stocks at 1,919 tons. From the initial quotations it would appear that the former are sufficiently large to maintain a contango whereas the latter are not large enough to prevent a backwardation.

Outside the U.K. a little buying of zinc has been reported from the Continent, probably due to fears of an interruption in supplies from Belgium. In the U.S. one of the leading producers is offering metal at a discount of $10 per ton under the E. and M.J. quotation which indicates that, whilst producers are anxious to get rid of metal, they will try to avoid reducing the official quotation.

The lead position remains unchanged with sellers predominating; although the recent fall in price has brought in some buyers, it is considered that any permanent rise in the price level will not be attained until some measure of cutback in production is agreed upon.

The week also saw the registration of Russian lead as good delivery on the L.M.E., which means that the Russians can make full use of the Exchange for the three metals which they export, namely, tin, lead and zinc. Lead production in O.E.E.C. countries totalled 61,243 tonnes in November as compared with 68,840 tonnes in October. Stocks at the end of the month showed a decline at 55,652 tonnes as against 59,425 tonnes at the end of October.

Production of zinc declined to 72,892 tonnes in November as compared with 74,267 tonnes in October. Stocks at the end of the month fell to 44,814 tonnes as compared with 50,714 tonnes at the end of October. The sudden increase in supplies of zinc, which was indicated by the establishment of a contango in London during December, is underlined by an increase in the imports of zinc into the U.S. during December against fourth quarter quotas.

At the end of the year all quotas for lead and zinc ores had been filled or almost filled, except that in zinc imports from Belgium were only a half of the tonnage permitted and those from Italy and Mexico a quarter and a third respectively.

MORE ACTIVITY IN TIN

The tin market has been a little more active. The undertone remains good from the commercial aspect and is being strengthened by the present political troubles in South East Asia. Shipments from Penang during December totalled 7,740 tons as against 7,371 tons during the previous month. This brought the total for 1960 up to 76,368 tons. The corresponding figure for 1959 was only 44,668 tons. The difference gives a measure of the improved position.

It is reported that the second tin agreement has now been signed by sufficient countries to enable the steps for its introduction to be continued. Stocks in official warehouses rose a further 159 tons to 9,556 tons. On Thursday the Eastern price was equivalent to £791¼ per ton c.i.f. Europe.

COPPER MARKS TIME

The copper market is still subject to end of year influences and, with the commencement of the strike in Chile being postponed for a week whilst further efforts are made to reach a settlement, dealers are unwilling to enter into major commitments. More and more people are beginning to talk about the over-production of the metal and it seems that the majority are expecting the producers to make further cutbacks in production if the price continues to slide. With a further increase in the stocks of 240 tons, bringing the total to 14,334 tons, the backwardation has tended to narrow.

OFFICIAL TURNOVER FIGURES

From the beginning of 1961 the L.M.E. will publish official weekly turnover figures for each calendar week (i.e. trading from Monday to Friday). As these will be nearly a week out of date by the time they can be published here, they will no longer appear in the table below. Instead they will be referred to in the text, together with any significant change in the level of trading activity which has occurred during the current week. No official turnover figures are published this week, but next week they will be given for the trading period January 2-January 6.

As regards 1960, turnover figures up to and including December 29 were published last week.

Turnover figures for December 30 were as follows: Copper 2,325 tons, tin 220 tons, lead 1,525 tons, zinc 2,450 tons.

Closing prices are as follows:

	December 29		January 5	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£227¼	£227½	£223½	£223¾
Three months	£225¼	£225½	£224¼	£224½
Settlement	£227½		£223¾	
LEAD				
Current ½ month	£61½	£62	£63½	£63¾
Three months	£63¼	£63½	£64¼	£64½
TIN				
Cash	£786½	£787	£788	£788½
Three months	£785½	£786	£789	£789½
Settlement	£787		£788½	
ZINC				
Current ½ month	£76½	£76¾	£80	£80¼
Three months	£77	£77¼	£78¾	£78½

LONDON METAL AND ORE PRICES, JAN. 5, 1961

METAL PRICES

Aluminium, 99.5%. £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £200 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 0d. lb.
Cerium (99%) net, £15 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99% Ge. kilo lots 2s. 5d. per gram
Gold, 254s. 3d.
Iridium, £20/£23 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Magnesium, 2s. 2¼d./2s. 3d. lb.
Manganese Metal (96%/98%) £275/£285
Nickel, 99.5% (home trade) £600 per ton
Osmium, £18/£22 oz. nom.
Osmiridium, nom.
Palladium, Imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £28/£28½
Quicksilver, £69½ ex-warehouse
Rhodium, £43/£45 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 46s. 6d. per lb.
Silver, 79½d. f. oz. spot and 79½d. f'd.
Tellurium, 28s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis		21s. 6d./22s. 0d per unit c.i.f.
Beryl (min. 10 per cent BeO)		240s./245s. per l. ton unit BeO
Bismuth		30% 5s. 0d. lb. c.i.f.
		20% 3s. 3d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (semifriable 48%)	(Ratio 3 : 1)	£15 5s. 0d. per ton c.i.f.
" Hard Lumpy 45%	(Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
" Refractory 40%		£11 0s. 0d. per ton c.i.f.
" Smalls 44%	(Ratio 3 : 1)	£13 5s. 0d. per ton c.i.f.
Baluchistan 48%	(Ratio : 3 : 1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides	(Ratio 10 : 1) Nb_2O_5 : Ta_2O_5	170s./172s. 6d. per l. ton unit c.i.f.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex. works
Lithium Ore—		
Petalite min. 3½% Li_2O		50s. 0d./55s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		50s. 0d./55s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		75s./85s. per ton f.o.b. Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£23 0s. d/d
Manganese Ore Indian—		
Europe (46%/48%) basis 60s. 0d. freight		73d./75d. c.i.f. nom.
Manganese Ore (43%/45%)		69d./71d. c.i.f. nom.
Manganese Ore (38%/40%)		nom.
Molybdenite (85%) basis		8s. 11d. per lb. f.o.b.)
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£28 0s. 0d. per ton c.i.f. Aust'n
Ilmenite 50/52% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		148s. 0d./153s. 0d. per unit c.i.f
Vanadium—		
Fused oxide 95% V_2O_5		7s. 6d./8s. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2		£16/£16 10s. ton c.i.f

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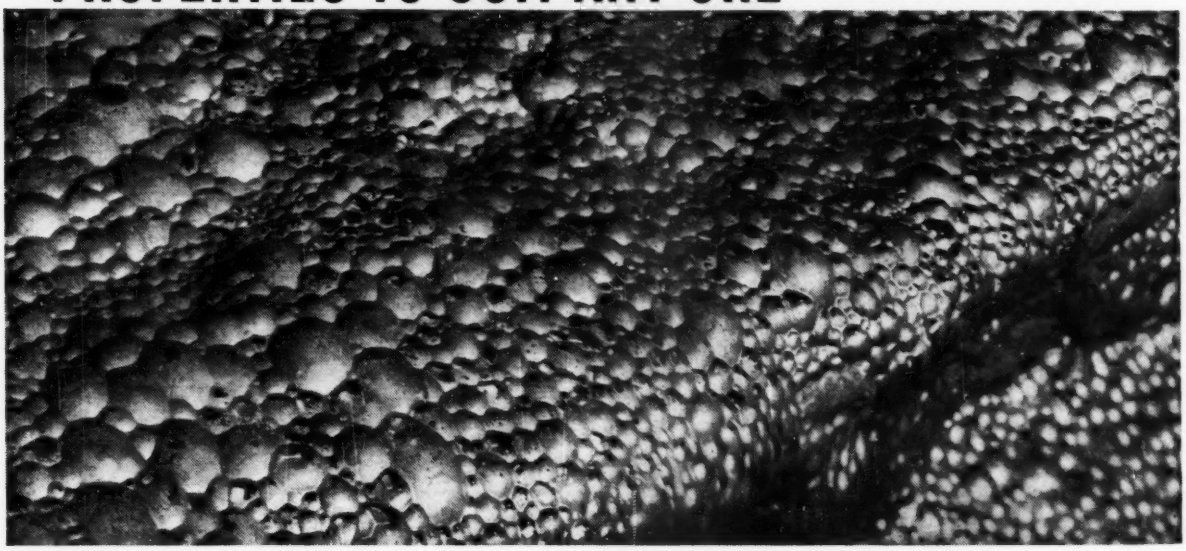

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Mining Finance

Light and Shadow in the O.F.S. Reports

The sum total of the vast mass of information that broke on the mining world this week with the issue of the annual reports and chairman's statements of the Anglo American Group's Orange Free State gold mines (see page 27), is that the rising dividend record of Free State Geduld looks like coming to a halt for the time being; Western Holdings should continue to pay more and the modest Welkom distributions should gradually increase; President Brand may just about hold its own in this respect, but President Steyn may possibly have to make some further cut in its dividend. Altogether, not exactly a shot in the arm for the share market.

On the other hand, the anticipatory fall in Free State Geduld shares seemed to have been rather overdone because technically there was no fresh bad news of prime importance in the report and the fact that a conservative dividend policy is to be continued could hardly have come as a surprise in view of the heavy capital expenditure requirements already announced and the fairly obvious possibility — now confirmed — that the current financial year to next September would see the start of tax liability. It is also stated by the chairman Mr. S. Spiro that in 1962 payments to the South African Government under the lease terms should begin.

Mr. Spiro gave no indication that the following of "a conservative dividend policy" by Free State Geduld would necessarily mean any cutback in payments for 1960-61. Eventually the full impact of tax and lease imposts will mean the syphoning off of a "substantial proportion" of earnings, but against this the working profit is not yet at its peak. It should improve further when additional facilities become available to hoist ore in the rich south-western section of the mine where two new shafts are being sunk as already announced. Capital expenditure for the current year to September 30 next is estimated at £2,500,000, but the 1959-60 accounts show that out of the appropriations for that year £1,800,000 remains for future requirements under this heading.

The technical side of the report also does not bring a great deal that is new. There is considerable faulting in the south-western area now being developed. There are still risks from high pressure water accumulations despite the tendency of the general water table in the O.F.S. gold field to drop. In the area north and east of No. 1 shaft development continues to give values markedly lower than those further south and the reef to the north of No. 2 shaft is, although satisfactory in value, also not so rich as that to the south. All this only confirms what has long been known.

In other words Free State Geduld is a "difficult" mine with only a relatively small proportion of its property containing the values that have given it ore reserves with the unsurpassed average for a mine of its size of 21.36 dwts. gold per ton—an average that may well yet be surpassed. Here lies the clue to the unpopularity of the shares relative to, say, Western Holdings that has been a feature of the Kaffir market for a good year now.

In the short term it is not proving possible to raise the tonnage milled quickly enough to offset the onset of tax liability. In December 93,500 tons were milled compared with a plant capacity of 125,000 tons. In the medium term, when the new shafts are in operation and profits resume their upward climb, tax and lease payments will be growing. Finally, in the long term there is the prospect that reef values will eventually be watered down by development in the northern and eastern parts of the large property.

So, at any rate until there is another fabulous reef strike, the market glamour for the speculator has gone out of Free State Geduld, while the gold-mining investor as such tends to look for those shares in the younger mines that have chances of expanding dividends. This chance has now disappeared for the time being from F.S.G. The 5s. shares are 117s. to yield 7.3 per cent on the 8s. 6d. dividend for 1959-60 which required a pay-out of £4,250,000 from a total profit of £7,926,013.

BRIGHTER PICTURE FOR WESTERN HOLDINGS

For the adjoining Western Holdings mine there is a brighter picture. This company has not got to face the onset of tax. It is already paying over half its profits to the Government. Mr. Spiro says that the development programme at present being undertaken should enable the company in the foreseeable future to earn profits at a level sufficient to meet future tax and lease liabilities and contemplated capital expenditure, and at least to maintain the current rate of dividend distribution. Capital expenditure for the current year to September 30 next is estimated to be £1,600,000.

The extensions to the reduction plant have been completed. It now has a rated capacity of 175,000 tons compared with the 155,000 tons monthly recently being crushed, a crushing that last month produced a record working profit of £910,038. Mr. Spiro also holds out hopes that a further increase in gold recovery should be possible. The December figure was 13.7 dwts. a ton compared with an ore reserve average of 16.75 dwts.

The new ventilation shaft should be helping to improve underground conditions at W. Holdings before the end of 1961. As regards reef development, Mr. Spiro points out that the highly satisfactory values of about 2,000 in-dwts. have been disclosed in work from No. 1 shaft in the area adjoining the Free State Geduld boundary.

Mr. Spiro has nothing fresh of importance to say about Western Holdings' other venture on the ground in the extreme northern Free State across the Vaal river from the Vaal Reefs mine other than that further boreholes are to be put down. Both Holdings and Free State Geduld now have a 25 per cent participation right apiece in the exploration of a large area of ground to the west of their present O.F.S. lease areas that is being undertaken by the Anglo American group.

London Market Highlights

South African gold shares ended the old year quite firmly. Although Johannesburg closed early in front of the holiday there was still sufficient interest to make prices edge ahead. But when the market reopened on Tuesday, sudden offerings of Free State Geduld from Johannesburg produced widespread dullness in kaffirs.

Free State Geduld plunged from 125s. to 115s. as a result of various disturbing rumours, ranging from technical difficulties underground to suggestions that the forthcoming quarterly report would contain disappointing development values. On Wednesday the shares recovered to 117s. and that evening the annual report appeared; apart from confirming that a conservative dividend policy was being followed, it contained little to acount for the previous nervousness.

Other kaffirs tended to become steadier on Wednesday, Western Holdings (151s. 3d.) being helped by the good monthly return for December; most mines reported lower milling and profits for last month as a result of the usual seasonal influences

Platinums were quietly firm, matters being helped by an announcement from the U.S. Joint Defence Production Congressional Committee that platinum was one of nine metals with unique properties that would be needed in significantly larger amounts during the next three and a half years of "space-age" developments. So despite the dullness of kaffirs, Potgietersrust improved several pence to 8s. 1½d.

Diamonds, on the other hand, were depressed for a while by another U.S. statement, this time the claim of G.E.C. of America to have produced synthetic stones of over 1 ct. De Beers lost 3s 1½d. to 153s. 1½d. but soon rallied to 154s. 4½d. and Consolidated African Selection Trust climbed back to 14s. 6d. from 14s.

Coppers moved narrowly for the most part but were beginning to look a firmer market on Wednesday following modest support from the Cape. Nchanga (45s. 9d.) and Rhodesian Anglo American (58s.) both improved a few pence.

Despite the troubled situation in Laos, tins began to edge upwards following further comment on the good company prospects for 1961. Tronoh were a good spot with a rise of 1s. 3d. to 36s. 9d. and Sungei Kinta came into the picture with a rise of 2s. to 15s. 6d. Several others gained a few pence. They included Tanjong (23s. 6d.), Ayer Hitam (21s. 6d.) and British Tin (30s. 9d.). Beralt came to life with a rise of 2s. 3d. to 32s. 6d. and Amalgamated Tin of Nigeria jumped 10½d. to 9s. 10½d.; the rises were linked to those in platinums, because the respective products of those two companies tungsten and columbite, were included in the nine "space-age" metals referred to in the U.S. report.

Lead-zincs moved uncertainly, sentiment being further unsettled by the latest setback in the prices of these metals. Among the miscellaneous golds Lake View at last appeared to bottom after the recent downdrift, hardening to 23s. 6d. Ashanti, however, met profit-taking and eased to 15s. 6d.

Western Holdings' dividend of 9s. 6d. for 1959-60 absorbed £3,560,779 from a net surplus, after tax, of £4,709,790. The 5s. shares stand at 151s. 3d. to yield 6.3 per cent before allowing for double tax relief. They are now 34s. 3d. higher than Free State Geduld. A year ago the difference was 17s. 6d. in the other direction. All in all the change round looks to have been justified by events, but whether it would still be right to switch from Holdings into F.S.G. is a much more doubtful question.

WELKOM-STEYN-BRAND

Of the other three mines' reports in the Anglo group, the hope is expressed that Welkom will be able to effect "a gradual increase in dividend distributions". There is a warning from President Steyn that, following the 1959-60 cut, "it may well be necessary to adopt an even more conservative dividend policy" until the benefits accrue from the new No. 3 shaft system. President Brand hopes that the grade lowering inherent in the opening up of the southern part of the property will be largely offset by increased mill tonnage when the new No. 3 shaft comes into full production.

JOS HOLDINGS IN ITS NEW ROLE

Jos Holdings has completed its first year as an investment company. The chairman, Mr. A. B. D. Fox, says that income has been buoyant and that the valuation of investments at the year-end on July 31 last reflects the progress that has been made. The quoted investments appear in the balance sheet at £379,582 and the market value at that date was £861,742. Jos Tin Areas, the Nigerian producer, is a subsidiary of the Holdings company, one that stands in the books of the parent concern at a nominal sum (£11,449). Mr. Fox thinks there are grounds for confidence about the future of this mine despite the fact that it is no longer young. In fact, 50 years have now passed since the formation of the original Jos company.

Jos Holdings has paid a dividend of 13¾ per cent on the 5s. units for the past year and is making a share capitalization for one for ten to mark its fiftieth year and a successful 1959-60. The units are quoted at 14s. 9d. equal to just on 13s. 6d. ex capitalization issue, at which the yield on a maintained dividend on the higher capital would be 5.1 per cent.

GOLD FIELDS AUSTRALIAN

Two points emerge from the chairman's statement to shareholders at last week's meeting of Gold Fields Australian Development Company, reported on page 32.

First, the outlook for the company's Mount Ida gold mine is extremely problematical. The main orebody is likely to become exhausted within the next few months and, although exploratory work is still continuing at the northern and southern extremities of the mine area, the chairman is in no position even to prophesy as to the outcome.

Secondly, shareholders can console themselves with the thought that with their shares standing at around 1s. 6d., this valuation is about covered by the company's net cash assets which stood at £148,000 on November 21, 1960. The market has thus already put a nil valuation on the Mount Ida mine.

RIO TINTO IN AUSTRALIA

The Rio Tinto Mining Co. of Australia Pty. Ltd. (Rio Tinto Australia) was formed in December, 1959, to acquire the Australian investments of the world wide Rio Tinto organization headed by the Rio Tinto Co. Ltd. of London. It was announced yesterday that it will shortly be converted into a public company and file a prospectus for an issue of 1,000,000 ordinary 5s. shares at 7s. a share.

Rio Tinto Australia owns 51 per cent of the issued ordinary capital and the whole of the preference capital of Mary Kathleen Uranium Ltd. which has a sales contract with the United Kingdom Atomic Energy Authority for the supply of uranium oxide worth some £A40,000,000. About one-third of the contract had been fulfilled as at September 30, 1960.

The other major investment of Rio Tinto Australia is a 75 per cent investment in Fitzpatrick Industries Pty. Ltd., which through two wholly-owned subsidiaries, is engaged in blue metal quarrying, sand winning and road contracting in the Sydney area. Rio Tinto Australia also maintains a substantial mineral exploration programme as an integral part of its activities. Currently areas are being explored in north-west Queensland and western Tasmania.

The paid up capital of the company after the issue will be £A3,610,000. The directors expect to be able to declare dividends on this capital at the rate of 10 per cent per annum. Because dividends on uranium mining in Australia remain tax free until 1965, dividends will for some years be free of Australian income tax to the extent that they are paid out of dividends received by Rio Tinto Australia from Mary Kathleen.

Mr. J. H. Hohnen, M.I.M.M., A.C.S.M., has recently been appointed managing director of Rio Tinto Australia. An Australian aged 49, he was until recently managing director of New Guinea Goldfields Ltd. and a member of the legislative council of New Guinea. He has had mining experience in India, Ghana and Nigeria.

SOME RECENT REEF INTERSECTIONS

Zandpan Gold Mining reports the intersection of the Vaal reef in borehole TL45 (4,800 ft. west of the No. shaft) at 6,608 ft. Values obtained were negligible but a leader reef intersected at 6,599 ft. assayed 8.13 dwt. over 40.6 inches equivalent to 330 inch dwts. Recoveries on two subsequent deflections showed substantially the same pattern with very small values on the Vaal Reef while a leader reef assayed 389 inch dwts. on the first deflection and 440 inch dwts. on the second.

Western Deep Levels reports that the ventilation shaft in the No. 3 shaft system which is in the process of being sunk to a depth of 7,000 ft. has intersected the Ventersdorp Contact reef at a depth of 6,413 ft. The reef which was found to be dipping in a northerly direction at 13 deg. has been sampled right around the shaft perimeter giving average values of 11.86 dwts. over 34.73 inches equivalent to 412 inch dwts.

Bracken Mines reports the intersection of the Kimberley reef by the No. 1 shaft at 2,363 ft. Sampling around the perimeter yielded 22.7 dwts. over 23 inches equivalent to 521 inch dwts.

Tongkah Tin to Seek U.K. Domicile.—The chairman of Tongkah Harbour Tin Dredging disclosed at the company's recent annual meeting that shareholders approval would shortly be sought for the transfer of the company's residence from Malaya to Britain. The chairman pointed out that this would result in a considerable tax saving and a financial benefit which would "accrue to all classes of shareholder wherever resident". Although Tongkah Harbour is registered in Malaya it operates in Thailand where it at present pays tax in addition to paying 40 per cent Malayan tax on dividend distributions. The move to Britain would avoid this latter liability and would allow the company to qualify as an O.T.C.

Halkyn Makes a Distribution.—In a circular to shareholders the Board of Halkyn District United Mines states that an early recovery in the lead price to a level at which the company could again operate its lead mines at a profit is not to be expected. As the present liquid resources are considerably in excess of what is needed for the conduct of its limestone business, it is considered appropriate to distribute a substantial part of them. Accordingly a special interim dividend of a 1s. per 2s. unit has been declared which will absorb a net amount of £25,195. It is also proposed there should be a further repayment of capital of 1s. per unit (requiring £41,135), subject to approval at a forthcoming extraordinary general meeting.

Amalgamated Collieries Maintains Dividend.—Amalgamated Collieries of South Africa report an estimated profit before tax for 1960 of £1,069,150 (£1,071,099) on which a final dividend has been declared of 1/6d. making an unchanged total for the year of 4/6d. All the coal companies in the Anglo American group are alike in having maintained their December dividends unchanged.

Consolidated Diamond Mines.—Consolidated Diamond Mines of South West Africa reports an estimated profit for 1960 before tax of £15,314,000 (£15,553,197). The final dividend of 15s. brings the total distribution for the year to the unchanged amount of 20s. per share.

Consolidated Mosher in Production by Next March.—Production at Consolidated Mosher Mines, in the Little Long Lac area of Canada, is scheduled for next March. Initially, 500 t.p.d. will be milled at the neighbouring plant of Macleod-Cockshutt, but this will be raised to the full 2,000 t.p.d. rate by the end of 1961. Macleod-Cockshutt has a 42.7 per cent direct and indirect interest in Consolidated Mosher.

Meru Results.—Meru Tin, a company which has suffered more than most from the lack of a workable land alienation programme in Malaya, has announced its results for 1959-60. The dividend is again passed, although last year's loss of £6,568 is reduced to £1,682. A debit balance of £5,154 is carried forward, against a debit of £3,525 brought in.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED

GOLD MINING COMPANIES IN THE ORANGE FREE STATE

(All companies mentioned are incorporated in the Union of South Africa)

Extracts from the Statements by Mr. S. SPIRO, Chairman of the Companies

issued with the Annual Reports for the year ended September 30, 1960

FREE STATE GEDULD MINES LIMITED

HIGHLY satisfactory progress was made in all spheres of the company's operations.

Increases in tonnage milled and yield, together with a slight reduction in the cost per ton milled, led to a substantial rise in working profit which, at £7,809,411, exceeded the previous year's profit by £2,139,775. Present indications are that, when additional facilities become available to hoist ore in the south-western section of the mine, still further improvements in working profit may be expected.

After adding to the working profit an amount of £116,602, representing the excess of sundry revenue over sundry expenditure, and the unappropriated profit of £410,069 brought forward from the preceding year, the sum available for appropriation was £8,336,082. Of this amount, dividends totalling 8s. 6d. per share (which compared with 8s. 0d. per share for the previous year) absorbed £4,250,000. After taking into account the appropriation of £3,599,870 for capital expenditure, and other small appropriations as set out in the accounts, a balance of profit of £478,712 remained to be carried forward.

Of the amount of £3,599,870 appropriated from profits for capital expenditure, £400,000 was used to finance excess expenditure on fixed assets over funds raised at September 30, 1959, and a further £1,399,870 was absorbed by capital expenditure during the year under review. Of the amount appropriated there thus remains £1,800,000 available for future capital expenditure which, during the current year, is expected to total £2,500,000.

Liability for Taxation

The effective value of the assets acquired by the company from Freddies Consolidated Mines Limited and ranking for redemption by this company for taxation purposes is £1,452,244. This amount is included in the estimated assessed loss for tax purposes of £2,587,500 at September 30, 1960. The company will become liable for taxation when profits earned exceed the sum of the tax loss and that portion of future capital expenditure ranking for redemption. It is anticipated that the initial tax liability will be incurred in 1961, and the first lease payment will become due in 1962.

The profits available for distribution will naturally be affected by the heavy capital expenditure programme and the incidence of tax and lease liabilities. A conservative dividend policy is therefore being followed to enable the company to meet its capital expenditure requirements from profits, thereby avoiding the necessity to increase the capital or to borrow funds. In determining the dividend policy, consideration has also been given to the fact that in due course the company will have to meet the full impact of tax and lease payments and that a substantial proportion of profits will have to be appropriated for this purpose.

Owing to the higher price for gold ruling on the London bullion market, the average prices received by the industry for the months of October and November, 1960, were 254s. and 253s. 10d. per fine ounce respectively, compared with the average monthly price of 249s. 9d. per fine ounce for the year under review. The additional revenue earned by this company for the two months period from the premium over the official dollar price amounted to approximately £32,000.

There was an increase of 158,000 tons in the ore milled and an increase of 1.58 dwt a ton in the average recovery grade. The increase in the tonnage milled is particularly encouraging when it is borne in mind that an extensive off-reef development programme was undertaken during the year, principally in the south-western sector of the lease area.

A total of 113,280 feet of development was accomplished during the year, an increase of approximately 20 per cent over the previous year. Of the 12,995 feet sampled, 92.5 per cent proved payable at a value of 1,396 inch-dwt which compares with 93.4 per cent and 1,547 inch-dwt in the previous year. This decrease in value is mainly attributable to the greater development footage undertaken in the No. 2 Shaft area, principally north of the shaft where values are lower than in the area south of the shaft, and to the comparatively smaller amount of reef development in the No. 1 Shaft area. Moreover, sampling in the previous year included the very high values encountered in 45 level south-west of No. 1 Shaft.

There was an increase of 257,000 tons in the ore reserves which at September 30, 1960, amounted to 3,023,000 tons. The average value of ore reserves improved by 0.50 dwt to 21.36 dwt per ton, owing mainly to the inclusion of new high grade tonnage in the south-western sector.

The No. 1A Ventilation Shaft was sunk to its final depth of 5,131 feet in October, 1960. The Basal Reef, which was intersected at 4,544 feet, was fully exposed around the perimeter of the shaft, and gave an average value of 2,170 inch-dwt.

It has become apparent that the reef in a large part of the south-western area lies between 35 and 43 levels, which is shallower than the existing stations at No. 1 Shaft. In view of this and the general remoteness of the area from No. 1 Shaft, it was decided during July, 1960, to sink a new hoisting shaft for the more rapid and economic exploitation of this comparatively rich area.

This hoisting shaft, which will be No. 4 Main Shaft, will be 24 feet in diameter and will be sunk to a depth of about 5,000 feet below surface in a position some 350 feet south of the present No. 1A Ventilation Shaft.

The Ventilation Shaft will be completed with separate compartments for upcast and downcast air. The downcast compartment will also be equipped to hoist a limited amount of development tonnage. This arrangement will enable development to be undertaken in the vicinity of the new hoisting shaft.

When the hoisting shaft is commissioned, the ventilation shaft will be converted entirely to upcast ventilation and will be renamed No. 4 Ventilation Shaft. The capital expenditure to be incurred in the sinking and equipping of No. 4 Main Shaft has been estimated at £2,900,000. The company will finance this expenditure out of profits.

Development Values

At No. 1 Shaft the average payable value of development increased from 1,467 inch-dwt to 1,501 inch-dwt. To the west of the shaft, intersections on several levels exposed reef of good value in the area commonly known as the "dome". Further raising from 45 level haulage south-west disclosed reef values which, although not as high as those found in earlier intersections, are still most satisfactory. The twin haulages on 43 level will connect with these raises; the first holing is expected to occur in the current financial year.

The speed at which development could be continued from No. 1 Shaft on the haulages on 49 and 51 levels towards the vicinity of No. 1A Ventilation Shaft was limited by the ventilation available. In the 49 level haulage the flatness of the dip to the south-east of the reverse fault zone, and the repetition of small upthrow faults enabled successive exposures of reef to be made, the values being comparable with the average for No. 1 Shaft area. The 45 level haulage has now been connected with the shaft. On 39 level from No. 2 Shaft a cross-cut

haulage being driven westward to connect with No. 1A Ventilation Shaft passed through the major Wesselia fault system and intersected Basil Reef. A raise on reef at this point disclosed encouraging values. At September 30, 1960, this haulage was within 1,500 feet of the shaft; when completed, it will assist in the the development of the area east of No. 4 Shaft above 39 level.

In the area north and east of No. 1 Shaft, development continued to give values markedly lower than those further south.

At No. 2 Shaft parallel footwall haulages are being driven northward on all levels from 43 to 51 levels towards the extension of the major Mijannie Fault system. The average values in this area, although satisfactory, are not as high as those to the south and, as a proportionately greater amount of development took place in the area north of the shaft than previously, the average payable development values for No. 2 Shaft, at 1,308 inch-dwt, are lower than in the previous year. In development south of the shaft, recent exposures have given values consistent with the average for the area.

Underground diamond drilling in the vicinity of No. 1A Ventilation Shaft had shown that the reef had been thrown up from 45 level to some distance above 39 level. As it was important to determine the exact elevation of the reef in this faulted block, in order to cut stations at the correct levels in the No. 1A Ventilation Shaft, the cross-cut west from 39 haulage was advanced into this area. The importance and urgency of this work clearly gave it priority over all other development on 39 level and the effect was to reduce the amount of development on the 39 haulage south.

Reclamation of the original shaft bottom on 53 level is progressing but has been slowed down by repeated intersections of water. Although the water table in the Orange Free State goldfield is tending to drop, heavy concentrations of underground water under high pressure may still be encountered in an area as faulted as this company's property.

With the completion of certain major haulages south to the Western Holdings boundary, it has been possible to commence work on headings eastward on 47 and 49 levels. The 47 level haulage has now passed through the Dagbreek Fault into footwall measures, and it is intended that, after reef has been intersected on the eastern side of the fault, lateral development will be carried out north and south. As part of the same exploratory programme, drilling is being undertaken in the extreme eastern section. The results of this drilling will provide a composite picture of ground lying between the Dagbreek Fault and the Welkom Gold Mining Company's lease area.

Reef Intersections

Borehole AR5, situated 4,500 feet due south of borehole AR4 in the south-east portion of the mining lease area, intersected the Basal Reef at a depth of 7,479 feet. The reef assayed 63.3 dwt of gold per ton over a corrected width of 5.54 inches equivalent to 351 inch-dwt. In a deflection, the Basal Reef was duplicated by a reverse fault and was intersected at 7,479 feet and 7,540 feet. The value in the upper intersection was 34.4 dwt of gold per ton over a corrected width of 4.99 inches equivalent to 172 inch-dwt, and the value in the lower intersection was 14.9 dwt. of gold per ton over a corrected width of 8.46 inches equivalent to 126 inch-dwt. Core recovery in all intersections was complete. The borehole deviated considerably and a further deflection is to be made from a position well above the reef horizon.

The water demineralization plant on this company's property operated throughout the year, achieving an output of over 30 million gallons per month. This output is, however, still far short of the original designed capacity and at present is uneconomic. Further experiments are now being conducted in an endeavour to rectify the present shortfall in output and to establish the plant as an economic proposition.

The company accepted a participation in certain prospecting and option contracts in respect of the mineral rights of an area of approximately 29,250 morgen to the west of the company's lease area. It is proposed to carry out an exploratory drilling programme in this area.

PRESIDENT STEYN GOLD MINING COMPANY LIMITED

THE total tonnage milled, at 1,222,000 tons, was an increase of 31,500 tons over the previous year. The fall in the recovery grade, which became evident early in 1960, necessitated an intensification of the rate of surface sorting and this was increased in the latter months of the financial year to well above the average rate of the previous year. The tonnage sorted amounted to 246,817 tons. In addition to the tonnage of ore sent to the reduction plant, a substantial amount of waste was hoisted. A large part of this waste resulted from No. 3 Shaft development. The total tonnage of more than 2,000,000 tons hoisted was well in excess of the rated capacity of the two operating shafts, and it is obvious that, with waste tonnage from No. 3 Shaft development work still being hoisted through No. 2 Shaft, no significant improvement in tonnage milled can be achieved until the No. 3 Shaft is brought into commission.

The total revenue earned from gold production was slightly higher than in 1959 because of the improved mill tonnage, although there was a marginal drop of 0.07 dwt. in the average recovery grade. The higher rate of sorting contributed largely to the increase of approximately 3s. 10d. in the cost per ton milled, but because of the declining grade and the rise in the cost of essential services and stores there was a net decline of £222,623 in gold working profits.

Net Profit

A total working profit of £2,844,586 was earned, a decrease of £230,702 compared with 1959. Working profit from gold was £2,103,669 and from uranium £740,917.

After deducting an amount of £185,200, the excess of interest charges and sundry expenditure over sundry revenue, the net profit for the year was £2,659,386. To this figure must be added the unappropriated profit of £397,900 brought forward, making £3,057,286 available for appropriation. Dividends absorbed £1,400,000 and £1,236,732 was set aside for capital expenditure. After allowing for other small appropriations, £413,054 was carried forward. It was not necessary to make provision for either taxation or lease payments, the company having an estimated assessed loss for taxation purposes at September 30, 1960 of £6,966,000.

Owing to the higher price for gold ruling on the London bullion market, the average prices received for October and November, 1960, were 254s. and 253s. 10d. per fine ounce respectively, compared with the average monthly price of 249s. 9d. per fine ounce for the year under review. The additional revenue earned by this company for the two months period from the premium over the official dollar price amounted to approximately £15,500.

At September 30, 1959, the capital and reserves, together with the fixed loans of £2,000,000 from Anglo American Corporation and £500,000 from National Finance Corporation—repayable in 1962 and 1964 respectively—and the balance owing on the uranium loans, exceeded expenditure on fixed assets by £800,000. The net expenditure during the year on fixed assets amounted to £2,246,321 and capital repayments totalling £390,411 were made in reduction of the uranium loans. This expenditure was financed in part by the aforementioned excess funds of £800,000 and the appropriation of £1,236,732 from profits. Accordingly, expenditure on fixed assets at September 30, 1960, exceeded the capital and loan funds provided at that date by £600,000.

Dividend Policy

The capital expenditure on shaft sinking, development and equipment is estimated at £2,500,000 for the current year. With the commissioning of the No. 3 Shaft system, the present major capital expenditure programme will have been completed. It was hoped that, despite the heavy capital expenditure programme, a reduction in dividends could be avoided. In the light of the decline in development values and in operating results during 1960, however, it was decided that a reduction in dividend distributions should be made to conserve funds for capital expenditure requirements and the future repayment of loans, if an increase in share capital was to be avoided. The total dividends declared in 1960, at 2s. per share, were 6d. less than in 1959, and it may well be necessary to adopt an even more conservative dividend policy pending the accrual of the benefits which, it anticipated, will be obtained from the commissioning of the No. 3 Shaft system.

By resorting to short term borrowings, it will be possible to obviate the necessity to finance from current profits the whole amount of this year's capital requirements. The company will thus be able to make the necessary appropriations out

of profits over a longer period, thereby reducing to a minimum the impact of this capital expenditure on dividend distributions in the short term.

A total of 65,045 feet was driven on development, and sampling on Basal Reef amounted to 13,180 feet, with an average payability of 88.9 per cent, which is little changed from the previous year. the average payable values have, however, fallen from 486 to 430 inch-dwt., resulting in a decline in the average value of ore reserves from 8.29 to 8.03 dwt. The ore reserve tonnage has increased satisfactorily from 4,869,000 to 5,177,000 tons.

With additional ventilation becoming available from the crosscuts to President Brand No. 3 Ventilation Shaft, it will be possible to develop the shallower areas west of No. 1 Shaft. The incline shaft to the eastern and deeper parts of the No. 1 Shaft area is making good progress having now reached 47 level and being fully equipped as far as 46 level.

Payability Maintained

At No. 1 Shaft development took place both north and south of the shaft, and, although payability was well maintained, the values exposed were lower than in the previous year. At No. 2 Shaft, reef development disclosed a more pronounced decline in values, payability also being slightly lower. The planned final depths for the No. 3 Twin Shaft system are 6,300 feet for the main shaft and 6,000 feet for the ventilation component. At November 30, 1960, depths of 5,625 and 5,906 feet respectively had been reached, and the completion of sinking operations is expected early in 1961. Thereafter it will be necessary to equip the hoisting shaft which will be brought into commission in the latter half of 1961.

Although the sampling of the reef intersections at the No. 3 Main and Ventilation Shafts gave assay values of only 173 and 175 inch-dwt respectively, it would be premature to attach special significance to them. Whilst these results are admittedly disappointing, members will recall that the precementation boreholes at the site of No. 3 Main Shaft had made reef intersections assaying 614 and 347 inch-dwt.

As stated last year, preparatory work has been undertaken to enable the new shaft to start hoisting ore for the mill at the earliest possible date. Haulages on 40 and 48 levels driven from No. 2 Shaft have reached the site of the No. 3 Shaft and the 44 level haulage is also expected to connect with the shaft shortly. However, this development has entailed the hoisting of a considerable amount of waste rock through No. 2 Shaft, thereby limiting the extent of development elsewhere in the No. 2 Shaft area, and hampering to some extent the flexibility of mining operations.

To the south-east of No. 3 Shaft a programme of drilling is at present being undertaken to provide information regarding the values and payability of this area of which very little is at present known. In November, 1960, borehole KP.11, situated about 4,300 feet due east of borehole KP.10 and approximately 8,500 feet in a southerly direction from No. 2 Shaft, intersected the Basal Reef at a depth of 6,703 feet. The reef assayed 70.7 dwt of gold per ton over a corrected width of 8.9 inches, equivalent to 629 inch-dwt. In a deflection, the Basal Reef was again intersected, this time at a depth of 6,701 feet and assayed 68.0 dwt of gold per ton over a corrected width of 8.9 inches, equivalent to 605 inch-dwt. In a second deflection, the Basal Reef was intersected at a depth of 6,701 feet and assayed 153.3 dwt a ton over a corrected width of 9.85 inches, equivalent to 1,510 inch-dwt. Core recovery was complete, and no further deflections will be made. These values are higher than those found in boreholes KP.4, KP.5, KP.6 and KP.10.

Profit Position

The deterioration in profits has naturally given rise to some concern. While the decline is attributed largely to the replacement of worked-out stopes by stopes of a lower grade, particularly in the No. 1 Shaft area, normally this position would have been compensated in some measure by drawing a larger tonnage of ore from No. 2 Shaft area which contains higher grade ore. This was, however, not possible as the hoisting capacity of No. 2 Shaft was already fully committed with the extra burden of the major development programme associated with the new No. 3 Shaft.

It is hoped to commence stoping in the No. 3 Shaft area by the end of the current financial year, and gradual build-up in mill tonnage can be expected in the following years. In the meantime, attention is being paid to other methods of reef extraction in those areas of the mine where it is overlain by wide bands of Khaki shale and where the resue method has been extensively used. If it is possible to undercut the reef in some of these areas, a saving in costs and an improvement in grade can be achieved.

A gradual restoration of the profit position may therefore be expected, but it would be premature to forecast any significant improvement until No. 3 Shaft comes into production and it becomes possible to increase materially the tonnage milled.

WESTERN HOLDINGS LIMITED

THERE was a continued improvement in mining operations, leading to a substantial increase in working profit which, at £9,737,220, was £3,267,603 higher than in the previous year.

This increased profit, together with the unappropriated profit of £709,938 brought forward from the previous year, enabled the company to declare dividends of 9s. 6d. a share, compared with 8s. 6d. the previous year, after financing capital expenditure totalling £1,365,987 and providing £5,250,600 for the estimated liability for taxation and State's share of profits. A balance of unappropriated profit of £504,028 was carried forward.

Compared with an income tax liability of £803,000 for the previous financial year, the amount payable for the year under review is estimated at £3,494,200. In addition, the company became liable during the year for its initial lease payment to the State amounting to £1,756,400. The development programme at present being undertaken should enable the company, in the foreseeable future to earn profits at a level sufficient to meet future tax and lease liabilities and contemplated capital expenditure, and at least to maintain the current rate of dividend distribution. Capital expenditure requirements for the current year on shaft sinking are estimated to be £1,600,000.

Owing to the higher price for gold ruling on the London bullion market, the average prices received by the industry for the months of October and November, 1960, were 254s. and 253s. 10d. per fine ounce respectively, compared with the average monthly price of 249s. 9d. per fine ounce for the year under review. The additional revenue earned by this company for the two months period from the premium over the official dollar price amounted to approximately £41,000.

Notable Increase in Grade

The higher working profit resulted mainly from a notable increase of 1.16 dwt a ton in the average recovery grade and an increase of 390,500 tons in the tonnage milled; there was also a reduction in working costs from 57s. 10d. to 56s. 5d. a ton milled.

The monthly milling rate rose steadily from 136,000 tons in October, 1959, to 157,000 tons in September, 1960.

The extensions to the reduction plant, have been completed. The plant now has a rated capacity of 175,000 tons per month.

Development continued at a high rate during the year and resulted in a satisfactory increase of 450,000 tons in the ore reserves to 5,180,000 tons, the average grade, at 16.75 dwt, being higher by 0.74 dwt. These figures indicate that further increases in the milling rate and recovery grade are attainable.

The decision to sink an upcast ventilation shaft adjacent to No. 1 hoisting shaft and to convert the ventilation facilities in the latter entirely to downcast was announced in July, 1960. The new shaft will have the effect of practically doubling the ventilation in the No. 1 Shaft area, and will make possible the exploitation of the deeper levels down to the Dagbreek fault and the prospecting of the area eastward beyond the fault. Furthermore, it will permit development into the north-western sector of the mining lease area beyond the Wesselia Fault system in the vicinity of borehole FH.2. The reef in this sector, which is thought to be an extension of the high grade zone in the south-west portion of the Free State Geduld property, is expected to lie between 40 and 36 levels. As the latter is the bottom working level of No. 3 Shaft, the area will be more easily mined from the No. 1 Shaft.

The new ventilation shaft will be 20 feet in diameter, and the final depth approximately 4,500 feet below collar. Sinking operations commenced in October, 1960, and by the end of November the shaft had been sunk to a depth of

1,144 feet. Additional ventilation from this shaft should become available before the end of 1961. The sinking of the shaft and the provision of the ventilation plant, which, together, are expected to cost £800,000, will be financed out of profits.

In the No. 1 Shaft area, development was carried out on all levels with highly satisfactory values, averaging about 2,000 inch-dwt, disclosed in the area adjoining the Free State Geduld boundary. The haulage on 38 level, from which raises have exposed these values, is advancing in a northerly direction, but is at present delayed by the necessity to penetrate a major dyke. Development undertaken to the south of No. 2 Shaft on 33, 38 and 45 levels towards the southern boundary gave satisfactory values.

Plans for the exploitation of the area east of the Dagbreek fault, have not yet been completed. The development programme for this part of the lease area is dependent on more detailed geological information from work in the area east of Nos. 1 and 2 Shafts and from the results of further development by Welkom Gold Mining Company, Limited, in its No. 3 Shaft area. Progress in the twin crosscuts on 43 level from No. 1 Shaft has been slow because of limited ventilation but the ventilation facilities from the new shaft will enable a much larger development programme to be undertaken in this area.

At both Nos. 1 and 2 Shafts, the sinking of the sub-incline shafts from 43 level to the Dagbreek fault continued. When the shafts are commissioned, it will be possible to undertake exploration of the ground below 43 level down to the Dagbreek fault.

Values Satisfactory

Numerous faults were encountered between 26 and 36 levels in the No. 3 Shaft area, and a large amount of crosscutting was necessary. Useful geological information has however now been gained which should assist in the future exploitation of this area. The payable values, averaging 1,106 inch-dwt, encountered in reef exposures in the No. 3 Shaft area, though not as high as last year, are still considered to be satisfactory.

In order to determine the position of the sub-outcrop of the Basal Reef, four boreholes have been drilled to the west of No. 3 Shaft. The results obtained from these boreholes have confirmed the view that values tend to decline in those areas lying in close proximity to the sub-outcrop. The company is drilling two further boreholes. Borehole RK.1 on the farm Rietkuil beyond the western boundary is being drilled for the purpose of obtaining information on the geological structure west of the lease area. Borehole AL.4 on the farm Lotgeval in the north-eastern section will help in the assessment of the potential of this sector of the mine.

Exploratory drilling continued on the ground adjoining the Vaal River immediately south of Vaal Reefs Exploration and Mining Company, Limited, where Western Holdings owns certain mineral rights. The results obtained from the drilling programme to date are detailed in the table accompanying the annual report.

The company has accepted a 25 per cent participation in the rights and obligations of Anglo American Prospecting Company (South) Limited in certain prospecting and option contracts in respect of the mineral rights of an area of approximately 29,250 morgen, situated to the west of the company's lease area. It is proposed to carry out an exploratory drilling programme.

WELKOM GOLD MINING COMPANY LIMITED

THE total working profit amounted to £1,625,577, of which £919,109 was from gold and £706,468 from uranium production.

After deducting £243,202 (the excess of sundry items of expenditure, including interest of £275,437 on loans, over sundry revenue) the net profit totalled £1,382,375. This amount, together with the unappropriated profit of £243,871 brought forward and the surplus of £1,510 realized on the purchase of the company's five per cent debentures and sale of trade investments, gave a total of £1,627,756 available for appropriation. Dividends absorbed £382,812 and £834,907 was set aside for capital expenditure and repayment of loans. The unappropriated profit to be carried forward was £401,027.

The deepening of No. 2 Shaft was completed during the year, bringing to an end the large capital expansion programme of recent years. The net expenditure during the year on fixed assets totalled £183,343. At September 30, 1960, expenditure on fixed assets exceeded by £950,000 the capital, reserves and loan funds provided. The company had drawn £1,856,291 against the loan facilities of £2,500,000 granted by Anglo American Corporation and an amount of £2,410,726 was owing on the uranium loans.

Increased Dividend Prospects

The conservative dividend policy pursued from the time of the declaration of a maiden dividend in 1957 has enabled the company to finance, from its own resources and by means of loans, the sinking of the No. 3 Shaft system and the deepening of Nos. 1 and 2 Shafts without an increase in capital. I am confident that, as No. 3 Shaft comes into full production, earnings should increase sufficiently to enable the company to meet, out of profits, future capital expenditure requirements, to repay its loan obligations and to effect a gradual increase in dividend distributions.

In view of the improvement in the productive and financial outlook of the company, the Board decided to increase the final dividend by 1½d. to 4½d. per share, the total distribution for the year being £382,812 (7½d. per share) compared with £306,250 (6d. per share) for the previous year.

The company will not become liable for taxation until such time as the assessed loss, estimated at £13,344,000 at September 30, 1960, together with any further redeemable capital expenditure, has been exceeded by profits.

Owing to the higher price for gold ruling on the London bullion market, the average prices received for the months of October and November, 1960, were 254s. and 253s. 10d. per fine ounce respectively, compared with the average monthly price of 249s. 9d. per fine ounce for the year under review. The additional revenue earned by this company for the two months period from the premium over the official dollar price amounted to approximately £12,000.

The monthly tonnage of ore milled was generally at a higher level than in 1959. The increase in the total tonnage milled during the year resulted mainly from mill tonnage becoming available from stopes in the new No. 3 Shaft area.

Work in the No. 3 Shaft area was largely restricted to primary development and most of the output of the mine continued to come from Nos. 1 and 2 Shafts. Waste sorting at the reduction plant amounted to 94,770 tons, equivalent to 7.4 per cent of the tonnage hoisted. The total tonnage milled in the year rose from 1,149,000 to 1,183,000 tons and the average gold recovery grade increased from 6.13 dwt to 6.32 dwt per ton. The effect on revenue of these increases was, however, more than offset by a substantial rise of 3s. 9d. in the cost per ton milled. This was to some extent caused by the inclusion in working costs of the charges incurred in operations at No. 3 Shaft, where a large amount of development was necessary to establish new stope faces. The cost of services and materials was also adversely influenced by the continuing general inflationary trend. As a result of the rise in costs, there was a decline of £49,219 in profits from gold production.

A total of 82,590 feet was advanced in development during the year with an average payable value of 458 inch-dwt, compared with 403 inch-dwt in 1959. This improvement in development values is reflected in an increase of 0.30 dwt in the ore reserve value. A further 161,300 tons were added to the ore reserves tonnage during the past year. This encouraging situation is mainly attributable to development carried out in the No. 3 Shaft area where sampling disclosed payability of 93.7 per cent and values averaging 520 inch-dwt.

Additional Reserves

Following the completion of operations to deepen No. 1 Shaft, development at lower levels commenced. A cross-cut haulage on 37 level, which was driven eastwards from the shaft to intersect reef, is now being developed laterally north and south of the haulage. This will open up a new section along the line of strike with raises up to 35 level. The large fault in the north of the property has been successfully negotiated. Values disclosed in this area have been low.

Increased ventilation is now available from No. 1 Vertical Ventilation Winze, and a programme of reclamation has been started to clear a number of ends in the shallower area west of No. 1 Shaft between 16 and 20 levels. Stoping and development had been stopped here because of the presence of dangerous concentrations of methane gas. Working laterally along strike, development

has already holed through into two raises, but because of the extreme caution required, progress has of necessity been slow. It is expected that the extra ventilation now available will eventually make it possible to block out additional reserves in the No. 1 Shaft area.

At No. 2 Shaft, development has been concentrated mainly on the area south-east and south-west of the shaft. The haulages on 32 and 35 levels have reached the President Steyn boundary, but development on reef has disclosed poor values. In the main block on 30 and 30A levels in the southern "sill" area, an improvement in values has been noted, and values in the south-western section, east of No. 3 Shaft, between 22 and 27 levels, are encouraging.

The area west of No. 3 Shaft is being opened up speedily and values, higher than the average for the mine, have been encountered. The ground is, however, heavily fractured because of its proximity to the Arrarat Fault and, while the major part of the area probably lies within the narrow range of 40 to 43 reef horizons, repeated faulting and the flat dip in the area have made it difficult to establish an orderly lay-out. The number of panels available for stoping is, therefore, still limited. Over the past year, however, the geological structure of the area has been more accurately determined and more rapid progress may be expected in the current year.

PRESIDENT BRAND GOLD MINING COMPANY LIMITED

A HIGHER mill tonnage and an improvement in the grade of ore milled were mainly responsible for an increase in the working profit from gold which, at £9,983,881, was £1,370,830 higher than in the previous year. Earnings from uranium production amounted to £551,056 to give the company a total working profit of £10,534,937, an increase of £1,361,912 over the previous year.

Sundry revenue exceeded sundry expenditure by £143,611 giving a net surplus for the year of £10,678,548. After adding the balance of profit of £422,127 brought forward at October 1, 1959, and £44 in respect of taxation overprovided in the preceding year, the amount available for appropriation was £11,100,719. Of this sum, dividends totalling 5s. 6d. per unit of stock—the same as for the previous year — absorbed £3,861,000, and £4,677,500 was provided for estimated taxation and lease liabilities to the State, compared with £3,941,500 for the previous year. An amount of £2,114,782 was set aside for capital expenditure. A balance of unappropriated profit of £439,937 remained.

Loan Repaid

At September 30, 1959, funds raised in the form of capital and loans exceeded the expenditure on fixed assets by £900,000. To this amount was added £2,114,782 appropriated from profits for capital expenditure, giving a total of £3,014,782. The company was therefore able to repay, in August, 1960, the loan of £500,000 from the National Finance Corporation and to finance the capital expenditure of £2,514,782 incurred during the year. It is estimated that expenditure on fixed assets during the current financial year will be about £2,000,000.

Owing to the higher price for gold ruling on the London bullion market, the average prices received by the industry for the months of October and November, 1960, were 254s. and 253s. 10d. per fine ounce respectively, compared with the average monthly price of 249s. 9d. per fine ounce for the year under review. The additional revenue earned by this company for the two months period from the premium over the official dollar price was approximately £37,000.

The total tonnage milled during the year rose by 128,000 tons to 1,395,500 tons.

A large proportion of the mill tonnage continued to be drawn from No. 1 Shaft area which at present contains the greater proportion of ore reserves and where values are higher than the average for the mine. The average recovery grade rose by 0.54 dwt to 16.29 dwt per ton.

The total of 80,131 feet developed was 13,187 feet more than in the previous year. Payability rose from 80.2 per cent to 89.2 per cent, but payable development values, at 910 inch-dwt, were lower than in the previous year.

Sinking operations at the No. 3 Twin Shaft System were completed during the year under review. When the ore and waste pass systems have been excavated and the remaining development work completed, it should be possible to begin hoisting mill tonnage without delay because stope faces will be available in the north and north-east sections of the mine as a result of development previously undertaken from No. 1 Shaft. It is expected that the new shaft will be commissioned early in 1961.

In February, 1960, reef was intersected in the Main and Ventilation Shafts of the No. 3 Shaft system and assayed 314 and 369 inch-dwt, respectively. These values are considered satisfactory in comparison with other reef exposures which have been obtained in the area adjacent to the common boundary with the President Steyn mine. Present indications are that values to the east of the northern area of the mine are lower than those encountered to the west of this area.

The additional ventilation resulting from the connection on 46 level to the Welkom No. 3 Joint Ventilation Shaft has made it possible to accelerate development in the northern section of the mine. To provide mill tonnage for No. 3 shaft, a long-wall stope, of some 3,500 feet in length extending from 46 level to 40 level, is being prepared. The main advantage of this method of mining is that the best use is made of the ventilating current.

The opening up of the ground to the east of the No. 1 Shaft, down to the major fault between Nos. 1 and 2 Shafts which at this point has an upthrow of nearly 1,000 feet, is being effected by a series of incline winzes from 46 level. In due course, connections for stoping purposes will be made with a haulage on 48 level driven from No. 3 Shaft together with haulages on lower levels from the No. 2 Sub-Vertical Shaft.

In the No. 2 Shaft area, satisfactory progress has been made in development on all levels from the 42 to 50 level horizons. Raising has been continued between these levels and has confirmed information obtained from earlier development that values in this area tend to be lower than those obtained in the northern part of the property. The equipping of the sub-vertical shaft system and the cutting of the ore and waste passes are expected to be completed in the current financial year and it will then be possible to develop on the deeper levels and thus build up the ore reserves of the No. 2 Shaft area.

In August, 1960, it was announced that borehole MG. 4, drilled some 3,050 feet south of No. 2 Shaft, had intersected the Basal Reef at a depth of 6,092 feet, assaying 26.9 dwt of gold per ton over a corrected width of 13.2 inches, equivalent to 355 inch-dwt. In early December, 1960, borehole S.P.7, situated 6,900 feet due south of No. 2 Sub-Vertical Shaft, intersected the Basal Reef at a depth of 5,849 feet, assaying 3.03 dwt of gold per ton over a width of 13.5 inches, equivalent to 41 inch-dwt. A hanging wall leader intersected at 5,846 feet assayed 7.7 dwt per ton over a width of 8.5 inches, equivalent to 65 inch-dwt. The core was very sheared, but core recovery was complete. A deflection is being made.

Further boreholes will be sunk in this southern area as part of a programme to obtain geological data.

Improved Ore Reserve

The ore reserve of 4,174,000 tons at the end of the financial year showed a satisfactory improvement of 370,000 tons. The stope value at 18.04 dwt was slightly lower in comparison with the previous year. It is to be expected that as development increases in the southern half of the property, the value of the ore reserve will tend to decline to a figure more representative of the whole lease area. This decline will naturally lead to a lower recovery grade, but it is hoped that a progressive increase in tonnage milled as No. 3 Shaft comes into full production will to a large extent offset any decline in working profit which might otherwise have resulted from the fall in grade. The uranium value of the ore reserves, at 0.315 lb. per ton, is slightly lower than last year.

The capacity of the reduction plant has been increased to handle a milling rate of 150,000 tons per month.

Copies of the Reports and Accounts of all the above-mentioned companies may be obtained from the London Secretaries of the Companies — Anglo American Corporation of South Africa Limited, 40 Holborn Viaduct, E.C.1.

GOLD FIELDS AUSTRALIAN DEVELOPMENT COMPANY

The Twenty-seventh Annual General Meeting of Gold Fields Australian Development Company Limited was held on December 29, 1960, in London.

Mr. R. H. A. Neuschild, Chairman, in the course of his speech, said:—

The increase in the group net cash assets during the 18 months to June 30, 1960 was £113,031. The total net cash assets at June 30, 1960 was £129,908.

To deal now with the position at the Mount Ida Mine, it is not expected that ore will be available from what remains of the main ore-body, for more than a few months.

Since July 1, 1960, and up to November 21, 1960, 13,000 tons have been treated, yielding 5,578 oz. of gold and the net cash assets have increased by approximately £18,000 to £148,000.

The diamond drill holes put down below the bottom level of the mine have so far given no helpful indications. A limited amount of the planned diamond drilling remains to be completed. The work proceeding at the south end of the mine, principally on the 6th Level, is not without encouragement, but it is too early yet to establish the significance of the results obtained.

As to the work undertaken beyond the northern end of the mine workings where a number of diamond drill holes were put down in 1955, I fear that one does not get much encouragement. It is a tantalizing position as some good values have been obtained. What we are after, however, is ore in mineable quantities.

As soon as it is possible to reach final conclusions in regard to the work now proceeding, a report will be issued to the Shareholders, setting out the consequences thereof.

It gives me particular pleasure, having so recently met Mr. E. B. Mundle, our General Manager in Kalgoorlie, and Mr. W. J. Hinchliffe and his Staff at the mine, to commend their enthusiastic efficiency to you. The Staff and operatives at Mount Ida total some 60 persons, all imbued with the right spirit for an operation in such a remote location.

The report and accounts were adopted.

JOS TIN AREAS LTD.

A SATISFACTORY YEAR

The annual general meeting of Jos Tin Areas Ltd., was held on January 4 in London, **Mr. A. B. D. Fox, A.R.C.S.** (the chairman) presiding.

The following is an extract from his circulated statement:

The Report which is now before you, covers the first complete year since the Company took over the mining properties of Jos Holdings Limited.

The Company has had a satisfactory year. The sales of Tin Concentrate amounted to 178½ tons as compared with 40½ tons for the five months trading of the previous year. In addition there was a sale of 9½ tons of Columbite. The profit for the year before allowing for taxation was £26,198 as compared with £5,096 for the previous five months to which must be added £4,252 brought forward from last year. After allowing £10,500 for taxation; £6,000 for writing down the Mining Leases (which now stand in the Books at nothing), and for a dividend of 5/- per unit which, less tax, amounted to £6,127, there is a balance of £7,823 to be carried forward to next year.

Costs and expenses continue to rise and the mine obviously doesn't get younger as the years pass. But it is reasonable to relate future expectations to past achievements, and on this basis at least there are grounds for confidence. Not the least of such grounds is the excellent work that has been done by Major Roberts and our Staff in London and Nigeria and our gratitude is due to him and them. It is a great pleasure to acknowledge such loyal support.

During the period under review, the issued capital was increased to £10,002 15s. 0d. in 40,011 stock units of 5/- each.

The report was adopted.

Coming Events

The Institution of Mining and Metallurgy announce that Mr. Robert Annan was re-elected Hon. Treasurer for the next session. The following were re-elected as vice-presidents: Mr. D. S. Burwood, Mr. W. Watson Connor, Mr. J. E. Denyer and Mr. J. B. Simpson. The Institution annual dinner will be held on March 21, 1961 and application for tickets should be made to the secretary not later than March 15.

★

The second national Laboratory Apparatus and Materials Exhibition will be held in the Royal Horticultural Society's New Hall, Westminster, from June 19-22, 1961, organized by UTP Exhibitions Ltd.

★

The Institution of Production Engineers announces that the 1961 Lord Sempill Paper will be given by Sir Percy Hunting, chairman of The Hunting Group of Companies, on January 25, at 6.30 p.m., in the Lecture Theatre of the Royal Aeronautical Society, London, W.1.

★

The Institution of Mining Engineers give notice of their 67th annual general meeting, on January 27, 1961, at 11.15 a.m., which will be held at The Royal Institution of Naval Architects, London, S.W.1.

Board Changes

It is announced that Mr. F. S. Berning has been appointed a manager of the Anglo American Corporation of South Africa, Ltd., with effect from January 1, 1961.

★

The Anglo American Corporation of South Africa announces the following appointments in its London office effective from January 1, 1961: Mr. D. S. Booth to be assistant London secretary; Mr. E. Burrows and Mr. G. J. Risby each to be a companies' secretary (London). Mr. G. E. Simmonds, joint London secretary, will retire from the service of the Corporation on January 7, 1961.

★

Mr. Edward E. Mocatta, joint managing director of Mocatta and Goldsmid, has been appointed a director of Hambros Bank.

★

Harrisons and Crosfield announce that Mr. J. B. Leask will act as chairman during the Eastern visit of Sir Leonard Paton. Mr. J. F. E. Gilchrist has been appointed vice-chairman of the company, with effect from January 1, 1961.

★

Mr. L. T. Campbell Pitt has been appointed an executive director of Gold Fields of South Africa, the wholly owned subsidiary of the Consolidated Gold Fields of South Africa.

★

Mr. R. M. P. Preston has retired from the board of Amalgamated Metal Corporation. He will remain a director of its subsidiary, the British Metal Corporation.

New Year Honours

Sir Alexander Fleck, chairman, Advisory Council on Research and Development, Ministry of Power, and of the Nuclear Safety Advisory Committee has been appointed a baron. A baronetcy has been conferred on Sir James Bowman, retiring chairman, National Coal Board. Dr. Cecil Dannatt, vice-chairman of Associated Electrical Industries has been created a knight. Sir Ellis Hunter, chairman and managing director, Dorman Long and Co., receives the O.B.E.

Christmastime.—Once again *The Mining Journal* received a delightful variety of calendars, Christmas cards and diaries from friends and well-wishers. We would like to acknowledge the good wishes for the New Year received from the following: Anderson, Boyes & Co. Ltd.; Atlas Copco, Ltd.; Aveling-Barford, Ltd.; The British Electrical Development Association; British Nylon Spinners, Ltd.; British Insulated Callender's Cables, Ltd.; Craelius Co. Ltd.; Crofts (Engineers) Ltd.; Davies Investments Ltd.; Denver Equipment Co.; Distington Engineering Co. Ltd.; The General Electric Company Ltd., of England; Hawker Siddeley Industries Ltd.; Holman Brothers Ltd.; Imperial Chemical Industries Ltd.; International Harvester Co. of Great Britain Ltd.; Mavor & Coulson Ltd.; Mond Nickel Co. Ltd.; Padley and Venables Ltd.; Stewart and Lloyds Ltd.; The United Steel Companies Ltd.; Hugh Wood & Co. Ltd. We would like to take this opportunity of wishing all our friends at home and abroad, once more, a Happy and Prosperous New Year.